
**Ships and marine technology —
Marine environment protection —
Arrangement and management of port
waste reception facilities**

*Navires et technologie maritime — Protection de l'environnement
marin — Disposition et gestion des installations portuaires de collecte
des déchets*

STANDARDSISO.COM : Click to view the full PDF of ISO 16304:2018



STANDARDSISO.COM : Click to view the full PDF of ISO 16304:2018



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Waste management strategy elements	3
4.1 General	3
4.2 Administrative and legal matters	3
4.3 Technology	4
4.4 Infrastructure and support services	4
5 Design and operation of PRFs	4
5.1 General	4
5.2 Port characteristics	4
5.2.1 Spatial and siting requirements	4
5.2.2 Types of cargo handled within the port or by the terminal	5
5.2.3 PRF service providers	5
5.2.4 External factors	5
5.3 Types	5
5.3.1 General	5
5.3.2 Floating	5
5.3.3 Mobile	5
5.4 Waste characteristics	6
5.4.1 General	6
5.4.2 Other considerations	6
5.5 Design capacity	6
5.5.1 General	6
5.5.2 Existing ports	6
5.5.3 New ports or terminals	6
5.6 Waste handling capabilities	7
5.6.1 Adequacy	7
5.6.2 Accessibility and suitability	7
5.6.3 Waste handling equipment	7
5.6.4 Storage	7
5.7 Participation in segregation, recycling or disposal programs	7
5.7.1 General	7
5.7.2 Recycling capabilities	7
5.7.3 Final disposal	8
6 Port waste management plan (PWMP)	8
6.1 General	8
6.2 Legislation and regulatory considerations	9
6.2.1 Applicable laws and regulations	9
6.3 Port structure and administration	10
6.4 Official responsibilities	11
6.5 Waste management	13
6.6 Cost recovery system — Financial considerations	13
6.6.1 General	13
6.6.2 Fee system for using a PRF	13
6.6.3 Information for port users (ship masters, ship owners, ship agents and port/terminal operators)	14
6.6.4 Cost advantages of reuse, recovery and recycling	15
6.7 Data collection and monitoring	15
6.7.1 Notification	15

6.7.2	Data management.....	15
6.8	Pre- and ongoing consultation.....	15
6.9	Additional documentation.....	16
7	Implementation.....	16
7.1	General.....	16
7.2	PWMP review.....	16
7.3	Periodic auditing.....	16
7.3.1	Conducting the audit.....	17
Annex A	(informative) Examples of waste streams originating from ships.....	18
Annex B	(informative) Waste conversion factors.....	22
Bibliography		23

STANDARDSISO.COM : Click to view the full PDF of ISO 16304:2018

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environment protection*.

This second edition cancels and replaces the first edition (ISO 16304:2013), which has been technically revised.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The development of adequate port reception facilities (PRFs) for ship generated waste and cargo residues is a major factor in the management of each of the shipboard waste streams covered by the International Convention for the Prevention of Pollution from Ships (MARPOL) Annexes I to VI, as amended, excluding Annex III (packaged dangerous goods). MARPOL requires that Party States ensure the provision of adequate reception facilities in ports to receive these wastes. Parties to MARPOL should have developed implementing legislation to provide for PRFs. Regional and intergovernmental legislation has also been developed. However, due to operational, ownership, geographic, and legislative differences in ports, there is a large disparity in how operations are conducted. To overcome some of the major issues, the International Maritime Organization (IMO), through its implementation of IMO Instruments (III) Subcommittee (formerly the subcommittee on Flag State Implementation) developed an action programme to tackle the inadequacy of PRFs.

To obtain the most efficient management of waste and to reduce the time and resource burden in segregating and handling waste in the ports, the concept of waste minimisation has been integrated into this document by incorporating the following principles:

- For waste generated aboard a ship:

“Prevention before recycling before energy recovery before disposal”

- Once the waste is offloaded ashore:

“Avoidance before reduction, before reuse, before recycling, before incineration with energy recovery, before disposal”

Ship owners and operators, cargo owners, and port and terminal owners and operators, along with governments are aware of the importance of well-organised and managed waste collection, especially with respect to health and safety on board ships and at ports and terminals. It has been acknowledged at the IMO that standardized methodologies for waste management both on board ships and ashore at PRFs would harmonize practices and ensure a smooth delivery of ship generated waste and cargo residues to shore-side facilities. ISO 21070 provides a methodology for ships to segregate their garbage, thus, port reception facilities worldwide may expect a certain level of ship segregated waste and cargo residues. However, ISO 21070 cannot work alone and needs to be complemented by a parallel International Standard for the reception of ship generated waste. This document assists in the planning for the provision of adequate PRFs.

This document is also meant to complement ISO 14001 by adding a component that extends its principles to management of ships' waste in ports. It provides a specific methodology that any port, harbour, terminal, or marina can apply to the planning, development and operation of its PRF. The document can be incorporated easily into other plans for achieving ISO 14001 accreditation, as an extension that focuses on PRF. Conversely, the processes put in place during the preparations for ISO 14001 accreditation will assist in meeting the development of a holistic Port Waste Management Plan (PWMP) under this document.

Ships and marine technology — Marine environment protection — Arrangement and management of port waste reception facilities

1 Scope

This document provides a method for addressing ship generated waste and cargo residues from when they are offloaded from the ship, to how they are managed ashore. The provision, operation and use of port reception facilities (PRFs) are inherently linked, so this document addresses the design of PRFs, and their operation and management. This document is designed to be used by ports and terminals with existing PRFs which aim to refine their systems; it can also be used by new ports and terminals that are developing PRFs.

Parties to MARPOL are obligated as Port States to ensure that port reception facilities (PRFs) adequate to meet the needs of the ships using them without causing undue delay are provided at their ports and terminals. MARPOL does not seek to regulate the management of ship generated waste and cargo residues at ports and terminals beyond the reception facility requirement. However, ports and terminals may need to consider national, regional and local regulations. While these regulations can exceed the scope of MARPOL, the IMO recognises the need to manage ship generated waste and cargo residues at ports and terminals as part of an environmentally sound management approach for avoiding, minimising, and eliminating pollution from ships.

In consideration of above, this document applies to the management of ship generated waste and cargo residues regulated by MARPOL that are discharged at ports and terminals. It also covers principles and issues that should be considered in the development of a PWMP, its implementation and PRF operations. The operation of any PRF is governed by the principles and procedures included in the PWMP. The procedures to operate the PRF and the development of a PWMP are closely linked and therefore are integrated into this document.

This document addresses the principles and issues that should be considered in:

- The development of a port waste management strategy;
- The design and operation of PRF;
- PWMP development, implementation and compliance; and
- PRF management and accountability.

This document has been designed to be used by ports and terminals of any size. It does not give specifics on the size or location of a PRF in each port, but provides a list of principles to be considered and applied to any size of type of port or terminal (e.g. marina, fishing port, container terminal, oil terminal, roll on/roll off terminal, cruise terminal, ferry terminal, bulk or general cargo terminal, ship repair or recycling facility, and offshore terminal). Inland ports and marinas and those ports that have entered regional arrangements for the provision of a PRF can also use this document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

adequacy

meeting the needs of ships normally calling at the port by PRFs and not providing ships with a disincentive to use them, not causing undue delays and contributing to the protection of the environment

[SOURCE: IMO Circular 834]

3.2

cargo residues

remnants of any cargo material which are not covered by Annexes I, II, IV and VI of the MARPOL convention and which remain on the deck or in holds following loading or unloading, including loading and loading excess or spillage, whether in wet or dry conditions or entrained in wash water but not including cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship

Note 1 to entry: Dry bulk cargo residues may include substances that are harmful to the marine environment (HME) with special restrictions for discharges including HME entrained in cargo hold wash water. PRFs for cargo residues considered to be HME may be required at loading or discharge ports that handle dry bulk cargoes.

3.3

energy recovery

energy reclamation from waste

3.4

hazardous waste

waste which, due to its nature, physical, chemical or infectious properties, is potentially hazardous to human health

3.5

medical waste

any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological materials, including but not limited to isolation wastes, infectious agents, human blood and blood products, pathological wastes, sharps, body parts, contaminated bedding, surgical wastes and potentially contaminated laboratory wastes and dialysis wastes

Note 1 to entry: Medical waste is distinguished into two categories: infectious and non-infectious [WHO 2007].

3.6

port

place of geographical area consisting of infrastructure and equipment as to permit, principally, the reception of all types of ships, including fishing vessels and recreational craft, for the loading or unloading of passengers, cargo, stores, equipment, fuel, fish from commercial or sport fishing, or for repairs or berthing or other related activities

3.7

port administration

public or private organisation or partnership with the responsibility for the operation of the port

3.8

port authority

organisation, either private or governmental, that manages the operations of a port, in whole or part

Note 1 to entry: Port authorities may have complete or limited jurisdiction within a geographic region.

3.9**port reception facility/ies****PRF****PRFs**

any facility or facilities operating in, or provided by, a port or terminal which is fixed, floating or mobile and is capable of receiving ship generated waste and cargo residues

3.10**quarantine waste**

any solid or liquid waste that requires special handling, segregation and disposal due to its potential to spread disease, diseases, or plant and animal pests when discharged or delivered ashore

Note 1 to entry: Quarantine waste may also include food waste from galley operations and may be described as international catering waste.

3.11**recreational craft**

boat or ship of any type regardless of means of propulsion that is intended for non-commercial sport or leisure purposes

3.12**ship**

vessel of any type whatsoever operating in the marine environment, including hydrofoil boats, air cushion vehicles, submersibles, floating craft, and fixed or floating platforms

Note 1 to entry: Ships may call at inland ports.

[SOURCE: MARPOL Article 2]

3.13**ship generated waste**

all waste, including sewage, and residues other than cargo residues, which are generated during the service of a ship and fall under the scope of Annexes I, II, IV and VI to MARPOL and operational waste as defined in Annex V or MARPOL

3.14**terminal**

specific and distinct cargo or passenger loading and unloading facility for ships

3.15**waste recovery**

recycling, reclamation or treatment of waste for reuse

4 Waste management strategy elements**4.1 General**

There are three main components of any waste management strategy: administrative and legal matters; technology; and infrastructure and support services.¹⁾

4.2 Administrative and legal matters

Many states have implemented legislation, policies and national waste management strategies that govern the management of waste received at PRFs. Such legislation may be considered when developing a port waste management strategy, as it will assist in determining how local compliance may affect the operation of PRFs within a port. Additionally, there may be a need for licensing and/or local approvals, and the port or terminal operator should consider waste tracking and documentation.

1) International Maritime Organization, 1999.

The best possible environmental solution for waste recovery and disposal should be identified. Waste management targets adopted by the national administration for ports and terminals within its jurisdiction may be considered in the development of port waste management strategies. If there are no such targets, then the port or terminal operator may wish to consider developing them.

4.3 Technology

PRFs should use waste management technology that is current and applicable for ship generated waste and cargo residues expected from ships using the port or terminal. Recycling and reclamation of waste is preferable to disposal (see 6.5). Therefore, any waste management strategy should recognize and promote alternative methods of waste management that utilise new and emerging technologies.

4.4 Infrastructure and support services

The waste management strategy should be developed with an awareness of the infrastructure and support services not only throughout the port or terminal, but also beyond those physical limits. There shall be in place suitable waste transport logistics, recycling facilities, treatment facilities, and if necessary, final disposal sites. These treatment and disposal facilities may or may not be located within the port. Waste management strategies should also incorporate proactive mechanisms to inform and educate those having an interest in using the PRF.

5 Design and operation of PRFs

5.1 General

The types and number of ships normally calling at the port or terminal and the nature of operations should be considered in the planning for the provision of a PRF. PRFs for relevant wastes shall be available without causing undue delay to ships or imposing economic or other disincentives for their use. The PWMP will provide options for waste collection and handling. The calculated PRF capacity and the design of the PRF provide a foundation for the PWMP. However, for those waste volumes that could be anticipated to fluctuate widely over different periods, the provision of a PRF should be adapted appropriately. The system designed to support and operate a PRF should consider the following core components.

5.2 Port characteristics

5.2.1 Spatial and siting requirements

The location of a PRF should be “convenient” and not create a disincentive for ships to use.²⁾ The location shall be suitable and sufficient to allow easy and safe use that does not impose an undue delay upon the ship. Siting considerations should include an awareness of the impact on other port operations as well as the public areas surrounding the port or terminal.

Larger ports and terminals may require higher capacities or more diverse capabilities. Construction of a new port or terminal may offer greater flexibility in design as opposed to making improvements to an existing PRF.

Regardless of the type of PRF that is chosen, the port or terminal geography and layout should be considered as part of the design phase. The best way to collect each waste stream throughout the port or at the terminal shall be determined. In a compact port with large berths, garbage waste disposal bins on each quay or a direct transfer to the waste handler could be implemented. However, in certain other port configurations, it may be better to collect waste by barge. If the port is lock-bound, waste can be landed upon entry or exit to the lock.

2) International Maritime Organization, 1999.

A port or terminal that is planning to increase operations in the future may see a rise in shipping waste volumes. This may result in a need to consider providing excess PRF capability during planning activities.

5.2.2 Types of cargo handled within the port or by the terminal

Multiple MARPOL waste reception facilities may be required. Ports or terminals that receive ships with diverse cargoes that could produce cargo residues, oily waste, and noxious liquid substance wash water could create unique waste handling challenges.

5.2.3 PRF service providers

Companies that are licensed or otherwise certified or approved to provide waste handling services should be identified and verified by the port administration or port authority. Effective port waste management goes beyond the act of receiving waste from ships. Good downstream waste management supports the intent and purpose of having a PRF.

5.2.4 External factors

Extreme weather conditions or extreme tidal cycles may make it difficult to access PRF services or hinder the operation of traditional waste handling equipment.

5.3 Types

5.3.1 General

The type of PRF can vary between ports and terminals and is determined after assessing the needs of users and the frequency of use.

5.3.2 Floating

The use of barges may have distinct advantages, as they are relatively mobile, typically have sufficient capacity to service multiple ships, and can receive most wastes. Their shallow draught allows for access in most port and terminal areas. However, sea state limitations may prevent floating reception facilities from operating at all times. Additionally, there is an added element of risk when transferring waste to a floating PRF, especially oily or noxious liquid mixtures, or in ports and terminals where ship traffic is heavy and continuous in volume.

5.3.3 Mobile

Vehicle-borne PRFs offer speed and flexibility, particularly with respect to smaller ports, terminals or marinas as a number of ships can be serviced before the vehicle is full. However, the capacity of vehicles, such as tank trucks and traditional garbage collection trucks may be a limiting factor when servicing large ships. This can cause delays and increase congestion in ports and terminals. Furthermore, certain areas may be off limits to third party waste collection organisations due to either safety or security concerns, or both. Also, the size of the vehicle may prohibit access to all areas of the port or terminal.

5.3.3.1 Other considerations

Temporary placement of containers or collection bins that are dropped off via truck and picked up at a later date after the container/bin is full, may be an option.

5.4 Waste characteristics

5.4.1 General

All types of ship generated waste and cargo residues that will be received and handled at the port or terminal shall be identified. Failure to consider certain waste streams may limit the services that the port or terminal may be able to provide. Wastes may be offloaded by ships in many different forms, from single waste streams such as oil, sewage or segregated waste, to mixed waste streams such as garbage. [Annex A](#) provides further information on types of ship generated waste and cargo residues.

NOTE See [Annex A](#) for a listing of waste streams and treatment options.

5.4.2 Other considerations

Not all waste streams will necessarily be produced by every ship or be offloaded in every port. Additionally, in some circumstances ships may need or wish to offload waste, such as food waste and cargo residues that could be discharged into the sea under the provisions of MARPOL but due to operations, company policy, or other considerations, the master of the ship chooses to offload these wastes ashore. Therefore, the PWMP should consider the following:

- a) Some ports or terminals may require ships to offload all, or part of, their waste prior to departure.
- b) Some port or terminals may treat waste from ships on international voyages differently than waste from ships on domestic voyages (such waste may include quarantine waste, international catering waste or food waste from galley operations).
- c) Ship generated waste and cargo residues may include hazardous waste or other wastes determined to be harmful to the marine environment.

5.5 Design capacity

5.5.1 General

The design of a PRF should be based on the number and types of ships calling on the port. The basic PRF capacity needed in the port or terminal, per waste stream or per ship type, can be calculated based on the expected or most probable level of traffic in the port.

5.5.2 Existing ports

For existing ports and terminals, the level/quantities of waste received in previous years can be used to determine PRF capacity. Additionally, if there is any anticipated change in traffic, regulation or waste management technology, then the initial figures may have to be modified.

5.5.3 New ports or terminals

When designing a new port or terminal or redesigning an existing port to handle new business, or larger or different types of ships, a calculation of waste reception facility capacity shall be made using estimates of the expected ship traffic. Calculations should take into consideration the number and frequency of port calls for each type of ship and the expected wastes that are generated aboard and delivered ashore based on:

- The type and size of ship;
- Cargo(es) handled (volumes or tonnes);
- The crew size, the number of passengers (if any);
- The average length of voyages for inbound ships; and

— Whether the port is a loading or unloading port or a combination of both.

If no data are available for a new port, the information could be obtained from other ports with similar traffic.

NOTE ISO 21070, Annex A provides information on calculation of the expected amounts of (Annex V) wastes.

5.6 Waste handling capabilities

5.6.1 Adequacy

A fundamental consideration is to determine the waste handling capabilities needed in order to meet the definition of adequacy (see 3.1).

5.6.2 Accessibility and suitability

Suitable PRFs for all waste streams shall be easily accessible by the ship. PRFs that are difficult to use and poorly arranged may create a disincentive for ships to properly dispose of their waste while at the port or terminal.

5.6.3 Waste handling equipment

There is a variety of equipment that can be used to collect, store and in some cases, treat or further process the different waste streams collected at ports and terminals. The equipment selected should be suitable for the type and quantity of waste.

Proper siting at the berth of waste handling equipment should be considered. Poor siting and lack of sufficient space for operation of equipment may raise safety concerns for ship personnel when using the PRF equipment. It could also create a risk for discharge into the environment and possibly create a disincentive for proper waste disposal.

5.6.4 Storage

Consideration should also be given to the period of time the fixed or mobile PRF can store the ship generated waste and cargo residues on site. This should also be taken into account in the PWMP. Lengthy storage of waste should be avoided, as it can create stress on the supporting infrastructure and impact the waste handling services for future ships. It may also affect the health and safety of workers and the environment if stored waste quantities exceed storage capacities. PWMPs that do not arrange for routine waste removal services shall ensure that waste storage receptacles of sufficient capacity and quantity are provided. Conversely, PRF that are serviced frequently may not need to have large capacity waste storage receptacles.

5.7 Participation in segregation, recycling or disposal programs

5.7.1 General

The provision for waste segregation may lead to increased participation in recycling programs. For this to be successful, segregated waste should remain segregated until the final treatment. Many PRF can be conveniently arranged to accommodate recycling and other waste management services. Additionally, ships that implement ISO 21070 will have waste segregation procedures that will make operations at the PRF and downstream waste management easier.

5.7.2 Recycling capabilities

Recycling is a process where materials, which are otherwise destined for final disposal are collected, processed or reprocessed, and then reused. These materials all have useful chemical or physical properties after having served their original purpose.

5.7.3 Final disposal

Final disposal of wastes should be viewed as a last option to be exercised only after alternatives have been explored, including energy recovery from wastes, and deemed unattainable. Several options for final disposal exist, and the benefits and drawbacks should be considered and documented in the port or terminal's waste management strategy.

6 Port waste management plan (PWMP)

6.1 General

Ports and terminals should, at a minimum, provide PRFs for ship generated waste (3.13) and cargo residues (see 3.2). As such, the PWMP takes into account the national waste management strategy and defines how and by whom waste is collected at a port or terminal. This is necessary as waste streams received from ships calling on ports or terminals shall be dealt with in an environmentally sound manner. Developing and following such a waste management strategy will ensure that all parties involved in the generation, reception and transfer of ship generated waste and cargo residues conform to recognised practices and standards. This serves to protect the health and quality of the port users, public and the environment.

There are five key elements that should be considered in a PWMP. They are:

- a) Development;
- b) Publication;
- c) Implementation;
- d) Enforcement of delivery of ship-generated waste and cargo residues by competent authorities; and
- e) Monitoring of the plan to ensure that all parties, including ships and facility providers are adhering to the plan, the plan is and remains fit for use and the reception facilities are adequate.

The development of a PWMP is the planning stage for the eventual provision of a PRF and is the most crucial and time consuming part of the process. First, the port should consider what waste reception services they should provide and exactly how they can provide them. The PWMP needs to be developed to manage the different waste streams generated on board a ship in an efficient and environmentally sound manner that does not cause undue delay to ships or disincentives to shipping. A PWMP can be developed in-house, or by a consultant; and it shall be transparent, auditable, include provisions for consultation with the stakeholders. It should identify the major principles of waste minimisation, management and disposal, while ensuring the health, safety and security concerns of the port or terminal user. The PWMP should also result in the development of a formal plan that shall be consulted upon, approved (if necessary) and used as the basis for developing the day-to-day manual for the management and operation of the PRF.

The PWMP should include relevant information on the following key areas outlining pertinent procedures and management measures, as appropriate:

- An analysis of the relevant regulations;
- The waste management structure into which the PWMP fits;
- The official responsibilities of the port owners/operators and other relevant parties and the different governmental administrations involved in controlling the management of ship generated waste and cargo residues;
- Geographical and administrative scope of the PWMP;
- Official responsibilities within the management and operation of the PRF within the port;
- An assessment of the need for the PRF (see 5.1);

- A description of the cost recovery system;
- Procedures for how to report and take action on alleged inadequacies of PRF;³⁾
- Explanation of reporting and notification procedures for ship generated waste and cargo residues;⁴⁾
- A description of the method for recording the amounts of wastes received;
- Procedures for ongoing consultations with organisations representing the port or terminal users, waste contractors, and other stakeholders, including a description of how the essential information will be made available to the public (e.g. shipping agents and other relevant stakeholders);
- Review, refinement (corrective and preventive) actions and/or auditing; and
- Enforcement measures.

Each plan will take into account the specific nature of the port or terminal and its users. This is then outlined in a formal plan which is implemented after consultation with all port stakeholders.⁵⁾

6.2 Legislation and regulatory considerations

6.2.1 Applicable laws and regulations

Before any PWMP or PRF can be developed or established, port or terminal administrators should undertake an analysis of the international, regional, national and local regulations that control waste and ship generated waste and cargo residues. That analysis should be included in the PWMP. National regulation, at a minimum, will reflect the international requirements found in MARPOL. These regulations may also set out the responsibilities, legal processes, waste management options and procedures with which the port or terminal will have to comply. Specific regulations may include but are not limited to:

- Responsibility for developing a PWMP;
- Procedure for approval of the PWMP;
- Procedures to keep the plan up-to-date and valid;
- Health and safety responsibilities for the port with respect to waste management, waste transfer and waste handling;
- Recovery and disposal regulations for different waste types;
- Any reporting requirements;
- Licensing and other requirements for the transfer, storage and disposal of the waste; and
- Requirements for the payment of fees, if applicable.

The design of a PRF should be based in part on the principle that ships using PRFs will not be subject to disincentives to properly dispose of their wastes. The following areas should also be examined:

- The existence of a waste management strategy for the port or terminal;
- Special rules regarding health, safety, security and the environment; and
- The port or terminal's experience with waste management.

3) International Maritime Organization, 2007.

4) International Maritime Organization, 2007.

5) International Maritime Organization, 2009.

Parties to MARPOL have a responsibility to ensure the provision at their ports and terminals, depending on the nature of their operation.⁶⁾ Prospective wastes, as defined in the Annexes to MARPOL include

- oily wastes,
- noxious liquid substances in bulk,
- sewage,
- garbage and cargo residues, and
- residues from exhaust gas cleaning systems and ozone depleting substances.

6.3 Port structure and administration

A brief review of the location of the port should be included in the PWMP.

The first issue to consider is the scope of the PWMP and what it will cover. Ports or terminals may join together in one plan to provide more efficient waste management services. The scope of the plan depends on the following factors:

- Official responsibilities placed on the ports or terminals;
- Type and size of the port;
- Geographical spread of the port or terminal facilities and the geographical layout of the port;
- Types of facilities within the port;
- If, in terms of cost to shipping and economies of scale, whether or not the port or terminal facilities should have their own PWMP; and
- Relationships and interfaces with, and agreements between, adjacent and nearby ports and terminals.

The port management or developer of a PWMP shall analyse the lay-out of the port or terminal and decide on the most appropriate way to handle ship generated wastes and cargo residues. A port may decide that certain terminals shall have their own PWMP, include all terminals in one PWMP or have a hybrid system covering certain facilities in a port in conjunction with independent plans. The port management or terminal operator should identify the responsible party for creating and implementing a PWMP. The PWMP may have many options as outlined in [Table 1](#).

Table 1 — Examples of different options in PWMP planning

Port	Potential PWMP structure	Comments
One port	One PWMP	The PWMP covers all PRFs in all port facilities throughout the port
One port with discrete terminals/port facilities contracted to other companies (e.g. container, bulk, oil, cruise) or forming port facilities for one type of ship (e.g. fishing vessel berths or marinas)	One PWMP	The PWMP brings together independently developed and implemented plans for each terminal/port facility in one volume
One port with discrete terminals/port facilities contracted to other companies (e.g. container, bulk, oil, cruise) or forming port facilities for one type of ship (e.g. fishing vessel berths or marinas)	Many PWMPs	Each discrete terminal or port facility has an independently developed and implemented PWMP. Efficiency of size and economies of scale depend on the size of the port facility and the traffic visiting it

6) Refer to the MARPOL Annexes for regulations pertaining to each waste type.

Table 1 (continued)

Port	Potential PWMP structure	Comments
One port with one or two discrete terminals contracted to other companies (e.g. container, bulk, oil)	One PWMP	The PWMP brings together any independently implemented plans for each terminal as a discrete section in the PWMP, and also provides an overarching PWMP for the other port facilities in the port
One port with one or two discrete terminals contracted to other companies	Many PWMPs	Each discrete terminal has an independently developed and implemented PWMP, with the other port facilities in the port covered by a separate overarching PWMP
Two or more ports/port facilities	One PWMP	One PWMP is produced to cover two ports or port facilities that are inherently linked by trade or geographic proximity to provide efficiency of size and economies of scale
	Two or more PWMPs	PRF are shared between ports, however, two or more PWMPs are developed, one for each port or port facility, to outline where ship generated waste and cargo residues can be discharged at each port. In such cases, ports or port facilities should be inherently linked by trade or geographic proximity and one shall have limited capabilities to provide a PRF (e.g. for environmental, security or space considerations)
	One PWMP	Development of one PWMP to cover a distinct geographic region, which outlines the provision of relevant PRF in every port (e.g. ports/port facilities under the control of one municipality or authority)

6.4 Official responsibilities

Once the scope of the PWMP has been identified, it is crucial to determine and identify who is responsible for each element of the plan, not only for the development phase but also for the operational phase. Therefore, the PWMP should outline and document the detailed responsibilities of the following parties:

- The Port Authority, which may include:
 - The Harbour Master,
 - The port's designated PRF manager, and
 - All staff involved in the management of the PRF, including staff involved in collecting fees, the reporting procedure from ships and liaison with waste contractors;
- Any individual terminals in the port and their staff responsible for PRF administration and operation;
- PWMP consultants;

- Ship operators, including
 - The ship's master,
 - The ship's designated waste management officer, and
 - Other appropriate staff on board ship;
- Ship agents;
- Waste facility providers;
- Waste transfer providers;
- Waste recovery and disposal providers;
- The Authority that approves the PWMP, if applicable; and
- Other appropriate government or non-government entities that may include but are not limited to officials involved in Port State Control (PSC), Maritime Administrations, Coast Guards, and Marine Environmental Protection officials.

The PWMP should also outline the administrative system needed for the management of the PRF. This may include but is not limited to:

- The entity that will provide administrative or operational oversight of the PRF whether in-house or through a contractor;
- Detailed responsibilities for the day-to-day PRF management;
- Flow charts or, action lists for each member of staff or contractor involved in managing the PRF;
- Procedures for training personnel, ensuring that all relevant port staff are trained, informed, and have the necessary competencies on all procedures concerning the PRF;
- Records of education, training, qualifications, etc. of workers;
- Procedures for tendering, awarding and monitoring contracts with local waste handlers, recovery companies and disposal companies;
- Procedures for the audit and pre-contract assessment of licensed waste contractors to ensure that licensed waste handling, recovery and disposal facilities are used. Special consideration should be given to how the waste is disposed of and ports should ensure waste is being disposed of appropriately according to local, national, regional and international regulations;
- The development of contracts that are based on the average port waste stream calculated in [5.5](#) ensuring that there are clauses to ensure the contractors can vary their service to account for PRF provisioning during peak and off-peak periods. Ports should also include an emergency clause to provide contingencies for large amounts of waste that may arise.
- For systems using the direct interaction between ships and contractors, a list of port and nationally approved contractors should be developed by the port, included in the PWMP and circulated to all ship agents operating in the port; and
- An assessment of how the PWMP relates to the company's ISO 9001 and/or 14001 accreditation, if appropriate.

NOTE Ships tend to report on volume, while disposal may be based on weight. An example of conversion factors between volume and weight can be found in [Annex B](#).

6.5 Waste management

The PWMP shall also consider what waste streams are likely to be encountered in the port. Ship generated waste and cargo residues may be delivered by ships in many different forms, from single substance waste streams, such as oil, sewage or segregated garbage, to mixed waste streams such as domestic garbage. Waste management is a key principle that should be applied to the development of the PWMP in order to promote and realise the environmentally sound management of waste.

The developers of the PWMP should liaise with local waste disposal companies and local licensed waste contractors to source and implement methods for collection, recovery and disposal of waste so it can be reused, recycled, reclaimed or otherwise treated in an environmentally sound manner. An analysis of the options for collecting these wastes should be developed based on the local market for waste disposal. For all of these activities, one or more public or private companies can be utilised. In some cases, the port or terminal operator can be part of this chain (e.g. collecting containers on the quay). It is important that all those involved in the waste management chain are aware of the principles of environmentally sound management and that the assessment of the costs reflect this.

There are a variety of methods that can be used to manage the different waste streams in ports and terminals, or off-site. These methods can include the use of gravity separation, physical, chemical or biological separation or treatment, or other alternatives. The selection of which method to use shall be suitable to the type and quantity of waste. An example of waste streams generated from ships can be found in [Annex A](#).

Ports and terminal operators should also consider promoting at-source waste minimisation on board ships and consider rewarding ships that adopt good waste management or environmental practices (e.g. minimising packaging during loading or the application of ISO 21070) with reduced fees. Methods that the port or terminal had adopted or considered should be documented in the PWMP.

6.6 Cost recovery system — Financial considerations

6.6.1 General

From the information on waste collected in [5.2.2](#), the detailed design of the PRF, the cost of providing the PRF and the cost of waste disposal (including reuse, recycling, reclamation and treatment), a fee per ship can be developed. Ports or terminals may consult with their competent authority to obtain guidance on this matter. The fee can also be varied with type or size of ship, and include costs of developing the PWMP and the administration cost for managing the system or collecting the fee (also called system costs). However, the fee should be based on the following principles:

- The waste generator should pay for the provision and use of the PRF;
- The “not for profit” principle with respect to the service the port or terminal provides (i.e. costs for the disposal and the provision of the PRF should not be inflated by the port or terminal for profit);
- The fee should be fair, non-discriminatory and reflect the costs of the facilities and services provided;
- Excessive fees will be a disincentive to use the PRF; and
- It should be transparent so that generators of the waste are aware of and understand all the components and methods for calculating fees.

6.6.2 Fee system for using a PRF

Types of fee systems include:

- *Indirect fee system* (also called *No special fee system*) — the cost will be entirely financed by the collection of fees from the ships;
- *Direct fee system* — the costs will be paid directly to the PRF;

- *Combinations of indirect and direct fee system* — the costs are partly financed by the collected fees;
- *Rebate system* — ships pay an upfront fee which can be partially refunded if the ship uses a PRF.

NOTE There are many variations among fee systems.

The fee will be used to cover the costs of the PRF in a port or terminal. When ships deliver waste streams that are not included in the fee system, there will be an additional direct fee.

The fee may also vary with the type or size (e.g. GT) of the ship, or its main engine capacity.

6.6.3 Information for port users (ship masters, ship owners, ship agents and port/terminal operators)

Ports should provide information on the development of fees and indirect costs for the provision of the PRF in the PWMP on the port's website and provide literature for distribution to ships and their agents. This could include a comprehensive list of the types of wastes and the cost of disposing of each type of waste in the port or terminal, including costs for excessive amounts of waste and off-hours service. The fee structure should be explained in the PWMP or any other relevant documents (e.g. Port Entry Guide or General Conditions/tariffs from a port) and include:

- The cost of any indirect fee;
- How any indirect fee has been calculated;
- What (which services) the fee covers;
- What rights (e.g. indirect costs, reimbursement, discount) a ship paying the fee has; and
- What is excluded.

This information should be included as a separate annex to the PWMP, so that it can be updated quickly without the need to revise the entire document.

Each port or terminal shall consider the most effective way of disseminating information to their users, specifically taking into account how irregular or new users of the port or terminal will be informed of the provisions of the PWMP. Making information publicly available will assist ship owners and operators with voyage and in-transit waste management planning.

Information to be made available to users of a PRF at the port or terminal includes:

- Brief reference to the fundamental importance of proper delivery of prescribed wastes;
- The location of the port reception facilities applicable to each berth, with a diagram or map;
- A list of prescribed wastes normally dealt with;
- A list of contact points, the operators and services offered;
- A description of procedures for delivery;
- A description of the charges or fee schedule (6.6.2); and
- Procedures for reporting alleged inadequacies of PRFs.

Complaint procedures should focus on resolutions originating at the local level before elevation of the complaint is considered.⁷⁾

7) International Maritime Organization, 2007.

6.6.4 Cost advantages of reuse, recovery and recycling

Reusing, recovering and recycling waste can reduce final waste disposal costs, generate income if the waste still has value and can improve the image and environmental credentials of the port or terminal. A variety of options can be considered, including refurbishment or repair, recycling by reconditioning, dismantling for parts, using a waste as a product or raw material, composting or energy recovery from the waste. An analysis of the options for collecting these wastes should be developed based on the local market for waste management and documented in the PWMP.

This may be difficult as certain waste processing facilities may not be available locally, or in the country where the waste is delivered. Therefore, the PWMP developers should liaise with local waste handlers to identify new opportunities and stimulate possible new waste recovery industries or opportunities.

6.7 Data collection and monitoring

6.7.1 Notification

The PWMP should also include detailed information on:

- Advance notification forms to the port or terminal of the expected waste the ship needs to discharge;
- Waste delivery notes or receipts – between the ship and the port or terminal, the ship and the waste contractor, or the port or terminal and the waste contractor, as appropriate;
- How this information on the waste delivered to the port or terminal is verified; and
- Monitoring and enforcement procedures in the port.

6.7.2 Data management

Port administrators should develop processes for collecting information on waste types and quantities that are actually received and how to conduct a comparison between the waste received and what was expected through the advanced notification submissions. Port administrators should endeavour to establish criteria for retention of data for statistical or study purposes and/or for accurate reporting purposes, if required.

Ports should develop a data management system that is “fit for use” and includes procedures that can handle:

- Waste notification by ships;
- Recording waste types and quantities delivered in port;
- The provision of waste delivery receipts to the ship;
- Evaluation and calculation of annual waste levels by ship type and waste stream;
- The provision of statistical data analysis, if necessary;
- Consultation with port users; and
- Invoicing and fees management.

6.8 Pre- and ongoing consultation

Throughout the process of designing a PRF, as well as other processes related to the operation and management of a PRF, port and terminal operators should consult with port stakeholders to determine the needs with respect to the provision of the PRF. This will help in determining the actual and potential levels of service for each waste stream and identify ways to improve service and reduce disruptions. Consultation should be documented.

Procedures should include a description of how information will be made available to the public. All the information pertinent to the management of the PRF should be made available to the ships visiting the port and their ship's agents in an easily understood format. There are many ways this can be done including a dedicated internet site or specific brochures or notices to shipping (see 6.6.3).

6.9 Additional documentation

The following documents should also be prepared by the port and included in the PWMP:

- A health and safety risk assessment for the storage, movement, collection and scheduled removal of waste in the port;
- Consideration of environmental impacts of PRF activities;
- An emergency response system for spills of waste, especially hazardous waste and oily waste; and
- Provision of facilities outside of normal working hours, especially those that are supplied on a ship by ship basis.

7 Implementation

7.1 General

Once consultation has identified and overcome any practical problems, the PWMP should then be submitted to the competent authority for approval. Once approved, the PWMP should be published along with any information that the port intends to provide to port users.

The PWMP should then be implemented. This can be outsourced or kept in-house, but either way, during the implementation phase the following issues should be regularly assessed:

- a) Do the facilities meet the requirements of the plan?
- b) Are performance standards being met?
- c) What is being done to address any identified deficiencies?

The port or terminal should also set up a system where individual problems encountered by ships with respect to the inadequacies of the PRF can be reported and overcome, and where under and over-capacity in the PWMP can be rectified in the short-term.

7.2 PWMP review

The plan shall be kept up to date, especially with respect to services provided and point of contact information. Procedures to update significant details in the PWMP without delay should be put in place. These include the results of regular reviews, changes in the fee structure or a review after significant changes in the operation of the port or in its PRF system. There should be processes in place to:

- Conduct a review and update of the PWMP based on data collected relevant to waste types, quantities, and frequency of use;
- Capture and implement best management practices and lessons learned resulting from reports of alleged inadequacies; and
- Implement corrective actions based on a finding of inadequacy.

7.3 Periodic auditing

The port should also develop a periodic auditing system for review at regular intervals which should include an assessment of adequacy of the designed facilities based on the ongoing collection of data

related to their use or the amount of waste collected from ships. Audits may be conducted internally, by national authorities, or by third-party auditors. This should also include an audit of operations based on the plan and from the perspective of the

- User,
- Port or terminal,
- Waste contractor,
- Waste disposal company, and
- Other stakeholders.

The results should then be used to refine any PRF and the fee charged for its use. This process should include ongoing consultation with port or terminal users and waste contractors.

7.3.1 Conducting the audit

The methodologies contained within ISO 14001 may be used as the basis for conducting the port-related aspects of the audit.

Annex A (informative)

Examples of waste streams originating from ships

Waste type	Recommended segregation (where possible)	Recommended PRF (where possible)	Final recommended waste management option (where possible)
Paper and paper products	Should be segregated from the general waste stream	Specific and separate waterproof PRF	Recovery by recycling
Glass	Should be segregated from the general waste stream	Specific and separate PRF	Recovery by recycling
Metals	Should be segregated from the general waste stream	Specific and separate PRF	Recovery by recycling
Plastics	Should be segregated from the general waste stream into their different types	Specific and separate PRF	Recovery by recycling
Dirty rags	Should be separated from the general waste stream	Specific and separate PRF	Treated with the waste stream of its most hazardous component, e.g. oil, food residues, etc.
Mixed domestic waste	Should be segregated from the general waste stream	Specific and separate PRF	Treated with the waste stream of its most hazardous component
Food waste	Should be segregated or kept separate from the general waste stream	Specific and separate PRF	Recovery by composting (see quarantine waste)
Quarantine waste	Should be kept separate from the general waste stream	Specific, secure and leak proof PRF	Due to public health requirements in specific countries, food waste, galley waste, or other organic waste may have to be treated as hazardous. The PWMP developer should contact the relevant authorities to determine if this is the case.
Dunnage	Should be kept separate from the general waste stream	Specific and separate PRF unless treated as quarantine waste	Recovery by recycling, reuse or used as energy source