

INTERNATIONAL MARITIME ORGANIZATION

RESOLUTION MEPC.38(29)

APPLICATION OF THE PROVISIONS OF ANNEX IV OF THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO, ON THE DISCHARGE OF **SEWAGE** IN THE BALTIC SEA AREA

adopted on 13 March 1990

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

NOTING the provisions of Annex IV of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), concerning the discharge of **sewage** from ships and the provisions of reception facilities in the Baltic Sea Area,

TAKING NOTE of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974, (Helsinki Convention), which Convention entered into force on 3 May 1980 and in its Annex I contains in substance the same provisions concerning the discharge of **sewage** and the provision of reception facilities as Annex IV of MARPOL 73/78,

NOTING ALSO that adequate reception facilities are available within the Baltic Sea Area,

NOTING FURTHER that the provisions of regulation 7 of Annex IV of the Helsinki Convention relating to **sewage** with regard to existing ships will become effective for all Parties to that Convention, Denmark, Finland, the German Democratic Republic, the Federal Republic of Germany, Poland, Sweden and the USSR, on 3 May 1990,

RECOGNIZING the importance, for the protection of the vulnerable marine environment of the Baltic Sea Area, of the aforementioned provisions on the discharge of **sewage** being applied in the Baltic Sea Area, not only by ships flying the flag of Parties to the Helsinki Convention, but also by ships flying the flag of other States,

TAKING INTO ACCOUNT resolution MEPC.5(XIV) concerning the discharge of oil in the Baltic Sea Area, resolution MEPC.23(22) concerning the discharge of noxious liquid substances, and resolutions MEPC.9(17) and MEPC.31(26) concerning the discharge of **garbage** in the Baltic Sea Area,

HAVING CONSIDERED a request for a recommendation in this respect by the Parties to the Helsinki Convention,

RECOMMENDS that Governments of States, which are not Parties to the Helsinki Convention, urge ships flying their flag to, as far as practicable, apply, as from 3 May 1990, the provisions of Annex IV of MARPOL 73/78 concerning the discharge of **sewage** when operating in the Baltic Sea Area.

Appendix I

Guidelines for the implementation of Annex V of MARPOL 73/78

Preface

The main objectives of these guidelines are to (1) assist governments in developing and enacting domestic laws which give force to and implement Annex V, (2) assist vessel operators in complying with requirements set forth in Annex V and domestic laws and, (3) assist port and terminal operators in assessing the need, for and providing, adequate reception facilities for garbage generated on different types of ships. Part IV (Garbage) of the Organization's Guidelines on the Provision of Adequate Reception Facilities in Ports, June 1978, has been modified and incorporated in this publication to consolidate all Annex V related guidelines. In the interest of uniformity, governments are requested to refer to these guidelines when preparing appropriate national regulation.

1 Introduction and definitions

1.1 These guidelines have been developed taking into account the regulations embodied in Annex V, the articles and resolutions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) (hereinafter referred to as the "Convention"). Their purpose is to provide guidance to countries which have ratified Annex V and are in the process of implementing the Annex. The guidelines are divided into seven categories that provide a general framework upon which governments will be able to formulate programmes for education and training of seafarers and others to comply with the regulations; methods of reducing shipboard generation of garbage; shipboard garbage handling and storage procedures; shipboard equipment for processing garbage; estimation of the amounts of ship-generated garbage delivered to port; and actions to ensure compliance with the regulations.

1.2 Recognizing that Annex V regulations promote waste management systems for ships, and that ships vary tremendously in size, mission, complement and capability, these guidelines include a range of waste management options that may be combined in many ways to facilitate compliance with Annex V. Further, recognizing that waste management technology for ships is in an early stage of development, it is recommended that governments and the Organization continue to gather information and review these guidelines periodically.

1.3 Although Annex V permits the discharge of a range of garbage into the sea, it is recommended that whenever practicable ships use, as a primary means, port reception facilities.

1.4 Governments should stimulate the provision and use of port reception facilities for garbage from ships, as outlined in section 7.2 of these guidelines.

1.5 The Convention provides definitions for terms used throughout these guidelines which establish the scope of Annex V requirements. These definitions are incorporated in section 1 of these guidelines and

in regulation 1 of Annex V. Definitions taken directly from the Convention are listed in section 1.6, and are followed by other definitions which are useful.

1.6 Definitions from the Convention

1.6.1 Regulations means the regulations contained in the annexes to the Convention.

1.6.2 Harmful substance means any substance which, if introduced into the sea, is liable to create hazards to human health, harm living resources and marine life, damage amenities or interfere with other legitimate uses of the sea, and includes any substance subject to control by the Convention.

1.6.3 Discharge, in relation to harmful substances or effluents containing such substances, means any release, howsoever caused, from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying.

1.6.3.1 Discharge does not include:

(i) dumping within the meaning of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, done at London on 13 November 1972; or

(ii) release of harmful substances directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources; or

(iii) release of harmful substances for purposes of legitimate scientific research into pollution abatement or control.

1.6.4 Ship means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms.

1.6.5 Incident means an event involving the actual or probable discharge into the sea of a harmful substance, or effluent containing such a substance.

1.6.6 Organization means the International Maritime Organization.

1.7 Other definitions

1.7.1. Wastes means useless, unneeded or superfluous matter which is to be discarded.

1.7.2. Food wastes are any spoiled or unspoiled victual substances, such as fruits, vegetables, dairy products, poultry, meat products, food scraps, food particles, and all other materials contaminated by such wastes, generated aboard ship, principally in the galley and dining areas.

1.7.3 Plastic means a solid material which contains as an essential ingredient one or more synthetic organic high polymers and which is formed (shaped) during either manufacture of the polymer or the fabrication into a finished product by heat and/or pressure. Plastics have material properties ranging from hard and brittle to soft and elastic. Plastics are used for a variety of marine purposes including, but not

limited to, packaging (vapour-proof barriers, bottles, containers, liners), ship construction (fibreglass and laminated structures, siding, piping, insulation, flooring, carpets, fabrics, paints and finishes, adhesives, electrical and electronic components), disposable eating utensils and cups, bags, sheeting, floats, fishing nets, strapping bands, rope and line.

1.7.4 Domestic waste means all types of food wastes and wastes generated in the living spaces on board the ship.

1.7.5 Cargo-associated waste means all materials which have become wastes as a result of use on board a ship for cargo stowage and handling. Cargo-associated waste includes but is not limited to dunnage, shoring, pallets, lining and packing materials, plywood, paper, cardboard, wire, and steel strapping.

1.7.6 Maintenance waste means materials collected by the engine department and the deck department while maintaining and operating the vessel, such as soot, machinery deposits, scraped paint, deck sweeping, wiping wastes, and rags, etc.

1.7.7 Operational wastes means all cargo-associated waste and maintenance waste, and cargo residues defined as garbage in 1.7.10

1.7.8 Dishwater is the residue from the manual or automatic washing of dishes and cooking utensils which have been pre-cleaned to the extent that any food particles adhering to them would not normally interfere with the operation of automatic dishwashers. Greywater is drainage from dishwater, shower, laundry, bath and washbasin drains and does not include drainage from toilets, urinals, hospitals, and animal spaces, as defined in regulation 1(3) of Annex IV, as well as drainage from cargo spaces.

1.7.9 Oily rags are rags which have been saturated with oil as controlled in Annex I to the Convention. Contaminated rags are rags which have been saturated with a substance defined as a harmful substance in the other annexes to the Convention.

1.7.10 Cargo residue for the purposes of these guidelines are defined as the remnants of any cargo material on board that cannot be placed in proper cargo holds (loading excess and spillage) or which remain in cargo holds and elsewhere after unloading procedures are completed (unloading residual and spillage). However, cargo residues are expected to be in small quantities. Cargo material contained in the cargo hold bilge water is not treated as cargo residues provided that the cargo material is not classified as a marine pollutant in the IMDG Code and the bilge water is discharged from a loaded hold through the vessel's fixed piping bilge drainage system.

1.7.11 Fishing gear is defined as any physical device or part thereof or combination of items that may be placed on or in the water with the intended purpose of capturing, or controlling for subsequent capture, living marine or freshwater organisms.

1.7.12 Seafarers for the purposes of these guidelines means anyone who goes to sea in a ship for any purpose including, but not limited to transport of goods and services, exploration, exploitation and associated offshore processing of sea-bed mineral resources, fishing and recreation.

1.8 Application

1.8.1 Dishwater and greywater are not included as garbage in the context of Annex V.

1.8.2 Ash and clinkers from shipboard incinerators and coal-burning boilers except ashes from plastic products which may contain toxic or heavy metal residues, disposal of which is prohibited by regulation 3(1)(a), are operational wastes in the meaning of Annex V, regulation 1(1), and therefore are included in the term all other garbage, in the meaning of Annex V, regulation 3(1)(b)(ii) and 5(2)(a)(ii), notwithstanding regulation 3(2) and paragraph 5.4.6.2 of these guidelines.

1.8.3 Cargo residues are to be treated as garbage under Annex V except when those residues are substances defined or listed under the other annexes to the Convention.

1.8.4 Cargo residues of all other substances are not explicitly excluded from disposal as garbage under the overall definition of garbage in Annex V. However, certain of these substances may pose harm to the marine environment and may not be suitable for disposal at reception facilities equipped to handle general garbage because of their possible safety hazards. The disposal of such cargo residues should be based on the physical, chemical and biological properties of the substance and may require special handling not normally provided by garbage reception facilities.

1.8.5 The release of small quantities of food wastes for the specific purpose of fish feeding in connection with fishing or tourist operations is not included as garbage in the context of Annex V.

2 Training, education and information

2.1 The definition of ships used in the Convention requires these guidelines to address not only the professional and commercial maritime community but also the non-commercial seafaring population as sources of pollution of the sea by garbage. The Committee recognized that uniform programmes in the field of training and education would make a valuable contribution to raising the level of the seafarers' compliance with Annex V, thereby ensuring compliance with the Convention. Accordingly, governments should develop and undertake training, education and public information programmes suited for all seafaring communities under their jurisdiction.

2.2 Governments may exchange and maintain information relevant to compliance with Annex V regulation through the Organization. Accordingly, governments are encouraged to provide the Organization with the following:

2.2.1 Technical information on shipboard waste management methods such as recycling, incineration, compaction, sorting and sanitation system, packaging and provisioning methods;

2.2.2 Copies of current domestic laws and regulations relating to the prevention of pollution of the sea by garbage;

2.2.3 Educational materials developed to raise the level of compliance with Annex V. Contributions of this type might include printed materials, posters, brochures, photographs, audio and video tapes, and films as well as synopses of training programmes, seminars and formal curricula;

2.2.4 Information and reports on the nature and extent of marine debris found along beaches and in coastal waters under their respective jurisdictions. In order to assess the effectiveness of Annex V, these studies should provide details on amounts, distribution, sources and impacts of marine debris.

2.3 Governments are encouraged to amend their maritime certification examinations and requirements, as appropriate, to include a knowledge of duties imposed by national and international law regarding the control of pollution of the sea by garbage.

2.4 Governments are recommended to require all ships of their registry to permanently post a summary declaration stating the prohibition and restrictions for discharging garbage from ships under Annex V and the penalties for failure to comply. It is suggested this declaration be placed on a placard at least 12.5 cm by 20 cm, made of durable material and fixed in conspicuous place in galley spaces, the mess deck, wardroom, bridge, main deck and other areas of the ship, as appropriate. The placard should be printed in the language or languages understood by the crew and passengers.

2.5 Governments are encouraged to have maritime colleges and technical institutes under their jurisdiction develop or augment curricula to include both the legal duties as well as the technical options available to professional seafarers for handling ship-generated garbage. These curricula should also include information on environmental impacts of garbage. A list of suggested topics to be included in the curriculum are listed below:

2.5.1 Garbage in the marine environment, sources, types and impacts;

2.5.2 National and international laws relating to, or impinging upon shipboard waste management;

2.5.3 Health and sanitation considerations related to the storage, handling and transfer of ship-generated garbage;

2.5.4 Current technology for on-board and shoreside processing of ship-generated garbage;

2.5.5 Provisioning options, materials and procedures to minimize the generation of garbage aboard ship.

2.6 Professional associations and societies of ship officers, engineers, naval architects, shipowners and managers, and seamen are encouraged to ensure their members' competency regarding the handling of ship-generated garbage.

2.6.1 Vessel and reception facility operators should establish training programmes for personnel operating and maintaining garbage reception or processing equipment. It is suggested that the programme include instruction on what constitutes garbage and the applicable regulation for handling and disposing of it. Such training should be reviewed annually.

2.7 Generalized public information programmes are needed to provide information to non-professional seafarers, and others concerned with the health and stability of the marine environment, regarding the impacts of garbage at sea. Governments and involved commercial organization are encouraged to utilize the Organization's library and to exchange resources and materials, as appropriate, to initiate internal and external public awareness programmes.

2.7.1 Methods for delivering this information include radio and television, articles in periodicals and trade journals, voluntary public projects such as beach clean-up days and adopt-a-beach programmes, public statements by high government officials, posters, brochures, conferences and symposia, cooperative research and development, voluntary product labelling and teaching materials for public schools.

2.7.2 Audiences include recreational boaters and fishermen, port and terminal operators, coastal communities, ship supply industries, shipbuilders, waste management industries, plastic manufacturers and fabricators, trade associations, educators and governments.

2.7.3 The subjects addressed in these programmes are recommended to include the responsibilities of citizens under national and international law; options for handling garbage at sea and upon return to shore; known sources and types of garbage; impacts of plastic debris on sea-birds, fish, marine mammals, sea turtles and ship operations; impacts on coastal tourist trade; current actions by governments and private organizations, and sources of further information.

3 Minimizing the amount of potential garbage

3.1 All ship operators should minimize the taking aboard of potential garbage and on-board generation of garbage.

3.2 Domestic wastes may be minimized through proper provisioning practices. Ship operators and governments should encourage ships' suppliers and provisioners to consider their products in terms of the garbage they generate. Options available to decrease the amount of domestic waste generated aboard ship include the following:

3.2.1 Bulk packaging of consumable items may result in less waste being created. However, factors such as inadequate shelf-life once a container is open must be considered to avoid increasing wastes.

3.2.2 Reusable packaging and containers can decrease the amount of garbage being generated. Use of disposable cups, utensils, dishes, towels and rags and other convenience items should be limited and replaced by washable items when possible.

3.2.3 Where practical options exist, provisions packaged in or made of materials other than disposable plastic should be selected to replenish ship supplies unless a reusable plastic alternative is available.

3.3 Operational waste generation is specific to individual ship activities and cargoes. It is recommended that manufacturers, shippers, ship operators and governments consider the garbage associated with various categories of cargoes and take action as needed to minimize their generation. Suggested actions are listed below:

3.3.1 Consider replacing disposable plastic sheeting used for cargo protection with permanent, reusable covering material;

3.3.2 Consider stowage systems and methods that reuse coverings, dunnage, shoring, lining and packing materials;

3.3.3 Dunnage, lining and packaging materials generated in port during cargo discharge should preferably be disposed of to the port reception facilities and not retained on board for discharge at sea.

3.4 Cargo residues are created through inefficiencies in loading, unloading and on-board handling.

3.4.1 As cargo residues fall under the scope of these guidelines, it may in certain cases, be difficult for port reception facilities to handle such residues. It is therefore recommended that cargo be unloaded as efficiently as possible in order to avoid or minimize cargo residues.

3.4.2 Spillage of the cargo during transfer operations should be carefully controlled, both on board and from dockside. Since this spillage typically occurs in port, it should be completely cleaned up prior to sailing and either delivered into the intended cargo space or into the port reception facility. Shipboard areas where spillage is most common should be protected such that the residues are easily recovered.

3.5 Fishing gear, once discharged, becomes a harmful substance. Fishing vessel operators, their organizations and their respective governments are encouraged to undertake such research, technology development and regulations as may be necessary to minimize the probability of loss, and maximize the probability of recovery of fishing gear from the ocean. It is recommended that fishing vessel operators record and report the loss and recovery of fishing gear. Techniques both to minimize the amount of fishing gear lost in the ocean and to maximize recovery of same are listed below.

3.5.1 Operators and associations of fishing vessels using untended, fixed or drifting gear are encouraged to develop information exchanges with such other ship traffic as may be necessary to minimize accidental encounters between ships and gear. Governments are encouraged to assist in the development of information system where necessary.

3.5.2 Fishery managers are encouraged to consider the probability of encounters between ship traffic and fishing gear when establishing seasons, areas and gear-type regulations.

3.5.3 Fishery managers, fishing vessel operators and associations are encouraged to utilize gear identification systems which provide information such as vessel name, registration number and nationality, etc. Such systems may be useful to promote reporting, recovery and return of lost gear.

3.5.4 Fishing vessel operators are encouraged to document positions and reasons for loss of their gear. To reduce the potential of entanglement and "ghost fishing" (capture of marine life by discharged fishing gear), benthic traps, trawl and gill-nets could be designed to have degradable panels or sections made of natural fibre twine, wood or wire.

3.5.5 Governments are encouraged to consider the development of technology for more effective fishing gear identification systems.

3.6 Governments are encouraged to undertake research and technology development to minimize potential garbage and its impacts on the marine environment. Suggested areas for such study are listed below:

3.6.1 Development of recycling technology and systems for synthetic materials returned to shore as garbage;

3.6.2 Development of technology for degradable synthetic materials to replace current plastic products as appropriate. In this connection, governments should also study the impacts on the environment of the products of degradation of such new materials.

4 Shipboard garbage handling and storage procedures

4.1 Limitations on the discharge of garbage from ships as specified in Annex XV are summarized in table 1. Although discharge at sea, except in special areas, of a wide range of ship-generated garbage is permitted outside specified distances from the nearest land, preference should be given to disposal at shore reception facilities.

4.1.1 Compliance with these limitations requires personnel, equipment and procedures for collecting, sorting, processing, storing and disposing, of garbage. Economic and procedural considerations associated with these activities include storage space requirements, sanitation, equipment and personnel costs and in port garbage service charges.

Table 1 - Summary of at sea garbage disposal regulations

Garbage type	***All ships except platforms		***Offshore platforms
	Outside special areas	**In special areas	
Plastics - includes synthetic ropes and fishing nets and plastic garbage bags	Disposal prohibited	Disposal prohibited	Disposal prohibited
Floating dunnage, lining and packing materials	> 25 miles offshore	Disposal prohibited	Disposal prohibited
Paper, rags, glass, metal, bottles, crockery and similar refuse	>12 miles	Disposal prohibited	Disposal prohibited
All other garbage including paper, rags, glass, etc.	>3 miles	Disposal prohibited	Disposal prohibited

comminuted or ground			
Food waste not comminuted or ground	>12 miles	>12 miles	Disposal prohibited
*Food waste comminuted or ground	>3 miles	>12 miles	>12 miles
Mixed refuse types	****	****	****

* Comminuted or ground must be able to pass through a screen with mesh no larger than 25mm.

** Garbage disposal regulations for special areas shall take effect in regulation 5(4)(b) of Annex V.

*** Offshore platforms and associated ships include all fixed or floating platforms engaged in exploration or exploitation of sea-bed mineral resources, and all ships alongside or within 500 m of such platforms.

**** When garbage is mixed with other harmful substances having different disposal or discharge requirement, the more stringent requirements shall apply.

Note : The Baltic Sea Special Area Disposal Regulations took effect on 1 October 1989.

4.1.2 Compliance with the provisions of Annex V will require careful planning by the ship operator and proper execution by crew members as well as other seafarers. The most appropriate procedures for handling and storing garbage on ship will vary depending on factors such as the type and size of the ship, the area of operation (e.g. distance from nearest land), shipboard garbage processing equipment and storage space, crew size, duration of voyage, and regulations and reception facilities at ports of call. However, in view of the cost involved with the different ultimate disposal techniques, it may also be economically advantageous to keep garbage requiring special handling separate from other garbage. Proper handling and storage will minimize shipboard storage space requirements and enable efficient transfer of retained garbage to port reception facilities.

4.2 To ensure that the most effective and efficient handling and storage procedures are followed, it is recommended that vessel operators develop waste management plan that can be incorporated into crew and vessel operating manuals. Such manuals should identify crew responsibilities (including an environmental control officer) and procedures for all aspects of handling and storing garbage aboard the ship. Procedures for handling ship-generated garbage can be divided into four phases: collection, processing, storage, and disposal. A generalized waste management plan for handling and storing ship-generated garbage is presented in table 2. Specific procedures for each phase are discussed below.

4.3 Collection

Procedures for collecting garbage generated aboard ship should be based on consideration of what can and cannot be discarded overboard while en route. To reduce or avoid the need for sorting after collection, it is recommended that three categories of distinctively marked garbage receptacles be provided to receive garbage as it is generated. These separate receptacles (e.g. cans, bags, or bins) would receive (1) plastics and plastics mixed with non-plastic garbage; (2) food wastes (which includes materials contaminated by such wastes); and (3) other garbage which can be disposed of at sea. Receptacles for each of the three categories of garbage should be clearly marked and distinguishable by colour, graphics shape, size, or location. These receptacles should be provided in appropriate spaces throughout the ship (e.g. the engine-room, mess deck, wardroom, galley, and other living or working spaces) and all crew members and passengers should be advised of what garbage should and should not be discarded in them. Crew responsibilities should be assigned for collecting or emptying these receptacles and taking the garbage to the appropriate processing or storage location. Use of such a system will facilitate subsequent shipboard processing and minimize the amount of garbage which must be stored aboard ship for return to port.

4.3.1 Plastics and plastics mixed with non-plastic garbage

Plastic garbage must be retained aboard ship for discharge at port reception facilities unless reduced to ash by incineration. When plastic garbage is not separated from other garbage, the mixture must be treated as if it were all plastic.

4.3.2 Food wastes

Some governments have regulations for controlling human, plant, and animal diseases that may be carried by foreign food wastes and materials that have been associated with them (e.g. food packing and disposable eating utensils). These regulation may require incinerating, sterilizing, or other special treatment of garbage to destroy possible pest and disease organisms. Such garbage should be kept separate from other garbage and preferably retained for disposal in port in accordance with the laws of the receiving country. With regard to such garbage, governments are reminded of their obligation to assure the provision of adequate reception facilities. Precautions must be taken to ensure that plastics contaminated by food wastes (e.g. plastic food wrappers) are not discharged at sea with other food wastes.

4.3.3. Other garbage

Garbage in this category includes, but is not limited to, paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials. Vessels may find it desirable to separate dunnage, lining and packing material which will float since this material is subject to a different discharge limit than other garbage in this category (see table 1). Such garbage should be kept separate from other garbage and preferably retained for disposal in port.

4.3.4 Additional receptacles which might be useful

4.3.4.1 Separate cans or bags could be provided for receiving and storing glass, metal, plastics, paper or other items which can be recycled. To encourage crew members to deposit such items in receptacles provided, proceeds generated from their return might be added to a ship's recreational fund.

4.3.4.2 Synthetic fishing net and line scraps generated by the repair or operation of fishing gear may not be discarded at sea and should be collected in a manner that avoids its loss overboard. Such material may be incinerated, compacted, or stored along with other plastic waste or it may be preferable to keep it separate from other types of garbage if it has strong odour or great volume.

4.3.5 Recovery of garbage at sea

4.3.5.1 Fishermen and other seafarers who recover derelict fishing gear and other persistent garbage during routine operations are encouraged to retain the material for disposal on shore. If lost pots or traps are recovered and space is not available for storage, fishermen and other seafarers are encouraged to remove and transport any line and webbing to port for disposal and return the bare frames to the water, or minimally, to cut open the traps to keep them from continuing to trap marine life.

4.3.5.2 Seafarers are further encouraged to recover other persistent garbage from the sea as opportunities arise and prudent practice permits.

4.3.6 Oily rags and contaminated rags must be kept on board and discharged to a port reception facility or incinerated.

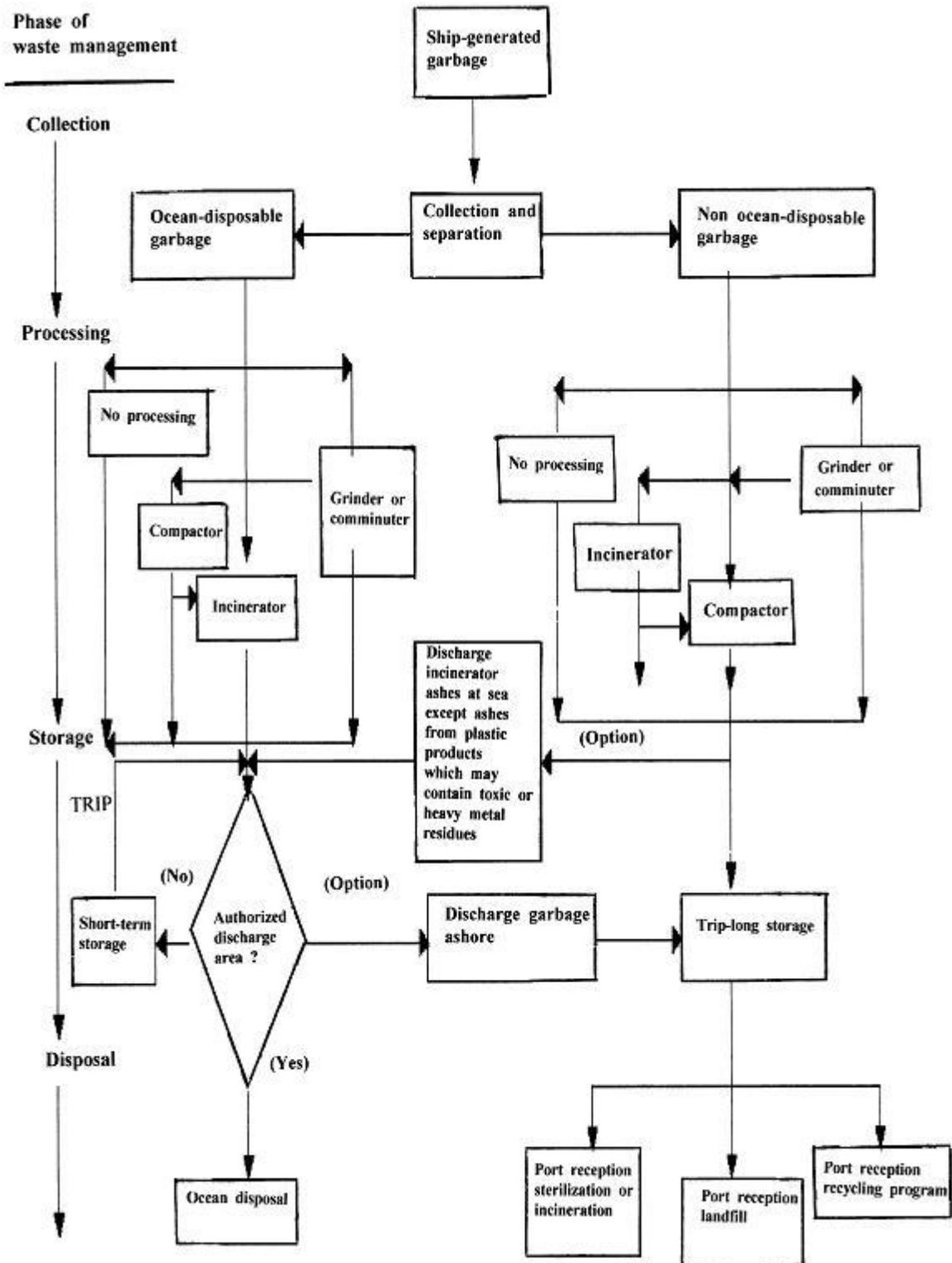
4.4 Processing

Depending on factors such as the type of ship, area of operation, size of crew, etc., ships may be equipped with incinerators, compactors, comminuters, or other devices for shipboard garbage processing (see section 5). Appropriate members of the crew should be assigned responsibility for operating this equipment on a schedule commensurate with ship needs. In selecting appropriate processing procedures, the following should be considered.

4.4.1 Use of compactors, incinerators, comminuters, and other such devices has a number of advantages, such as making it possible to discharge certain garbage at sea which otherwise might not be permitted, reducing shipboard space requirements for storing garbage, making it easier off-load garbage in port, and enhancing assimilation of garbage discharged into marine environment.

4.4.2 It should be noted that special rules on incineration may be established by authorities in some ports and may exist in some special area. Incineration of the following items requires special precaution due to the potential environmental and health effects from combustion of by-products: hazardous materials (e.g. scraped paint, impregnated wood) and certain types of plastics (e.g. PVC-based plastics). The problems of combustion of by-products are discussed in 5.4.6.

Table-2 Options for shipboard handling and disposal of garbage



4.4.3 Ships operating primarily in special areas or within 3 nautical miles from the nearest land should choose between storage of either compacted or uncompacted material for off-loading at port reception facilities or incineration with retention of ash and clinkers. This is the most restrictive situation in that no

discharge is permitted. The type of ship and the ship and the expected volume and type of garbage generated will determine the suitability of compaction, incineration, of storage options.

4.4.4 Compactors make garbage easier to store, to transfer to port reception facilities, and to dispose of at sea when discharge limitations permit. In the latter case, compacted garbage may also aid in sinking, which would reduce aesthetic impacts in coastal waters and along beaches, and perhaps reduce the likelihood of marine life ingesting or otherwise interaction with discharged materials.

4.4.5 Ships operating primarily beyond 3 nautical miles from the nearest land are encouraged to install and use comminuters to grind food wastes to a particle size capable of passing through a screen with openings no larger than 25mm. Although larger food scraps may be discharged beyond 12 nautical miles, it is recommended that comminuters be used even outside this limit because they hasten assimilation into the marine environment. Because food wastes comminuted with plastics cannot be discharged at sea, all plastic materials must be removed before food wastes are ground up.

4.5 Storage

Garbage collected from living and working areas throughout the ship should be delivered to designated processing or storage locations. Garbage that must be returned to port for disposal may require long-term storage depending on the length of the voyage or arrangements for off-loading (e.g. transferring garbage to an offshore vessel for incineration or subsequent transfer ashore). Garbage which may be discarded overboard may require short-term or no storage. In all cases, garbage should be stored in manner which avoids health and safety hazards. The following points should be considered when selecting procedures for storing garbage:

4.5.1 Ships should use separate cans, drums, boxes, bags or other containers for short-term (disposable garbage) and trip-long (non-disposable garbage) storage. Short-term storage would be appropriate for holding otherwise disposable garbage while a ship is passing through a restricted discharge area.

4.5.2 Sufficient storage space and equipment (e. g. cans, drums, bags or other containers) should be provided. Where space is limited, vessel operators are encouraged to install compactors or incinerators. To the extent possible, all processed and unprocessed garbage which must be stored for any length of time should be in tight, securely covered containers.

4.5.3 Food wastes and associated garbage which are returned to port and which may carry diseases or pests should be stored in tightly covered containers and be kept separate from garbage which does not contain such food wastes. Both types of garbage should be stored in separate clearly marked containers to avoid incorrect disposal and treatment on land.

4.5.4 Storage of waste fishing gear on deck may be appropriate if materials have strong odours or if their size is too great to permit storage elsewhere on the ship. In cases where gear is fouled with marine growth or dead organisms, it may be reasonable to tow gear behind the vessel for a time to wash it out before storing. If it cannot be recovered by the vessel, the appropriate coastal State should be notified of its location.

4.5.5 Disinfection and both preventative and remedial pest control methods should be applied regularly in garbage storage areas.

4.6 Disposal

Although disposal is possible under Annex V, discharge of garbage to port reception facilities should be given first priority. Disposal of ship-generated garbage must be done in a manner consistent with the regulations summarized in table 1. When disposing of garbage, the following points should be considered:

4.6.1 Garbage which may be disposed of at sea can simply be discharged overboard. Disposal of uncompacted garbage is convenient, but results in a maximum number of floating objects which may reach shore even when discharged beyond 25 nautical miles from the nearest land. Compacted garbage is more likely to sink and thus less likely to pose aesthetic problems. If necessary and possible, weights should be added to promote sinking. Compacted bales of garbage should be discharged over seep water (50 m or more) to prevent rapid loss of their structural integrity due to wave action and currents.

4.6.2 Floating cargo-associated waste that is not plastic or otherwise regulated under other MARPOL annexes may be discharged beyond 25 nautical miles from the nearest land. Cargo-associated waste that will sink and is not plastic or otherwise regulated may be discharged beyond 12 nautical miles from the nearest land. Most cargo-associated waste may be generated during the loading and unloading process, usually at dock side. It is recommended that every effort be made to deliver these wastes to the nearest port reception facility system prior to the ship's departure.

4.6.3 Maintenance wastes are generated more or less steadily during the course of routine ship operations. In some cases, maintenance wastes may be contaminated with substances, such as oil or toxic chemicals, controlled under other annexes or other pollution control laws. In such cases, the more stringent disposal requirements take precedence.

4.6.4 To ensure timely transfer of large quantities of ship-generated garbage to port reception facilities, it is essential for ships or their agents to make arrangements well in advance for garbage reception. At the same time, disposal needs should be identified in order to make arrangements for garbage requiring special handling or other necessary arrangements. Special disposal needs might include off-loading food wastes and associated garbage which may carry certain disease or pest organisms, or unusually large, heavy, or odorous derelict fishing gear.

5 Shipboard equipment for processing garbage

5.1 The range of options for garbage handling aboard ships depends largely upon costs, personnel limitations, generation rate, capacity, vessel configuration and traffic patterns. The types of equipment available to address various facets of shipboard garbage handling include incinerators, compactors, comminuters and their associated hardware.

Table-3 Compaction options for shipboard-generated garbage

Typical examples	Special handling by vessel personnel before compaction	Compaction characteristics			On-board storage space
		Rate of alteration	Retainment of compacted form	Density of compacted form	
Metal, food and beverage containers, glass, small wood pieces	None	Very rapid	Almost 100%	High	Minimum
Comminuted plastics, fibre and paper board	Minor - reduce material to size for feed, minimal manual labour	Rapid	Approximately 80%	Medium	Minimum
Small metal drums, uncomminuted cargo packing, large pieces of wood	Moderate - longer manual labour time required to size material for feed	slow	Approximately 50%	Relatively low	Moderate
Uncomminuted plastics	Major - very long manual labour time to size material for feed; usually impractical	very slow	Less than 10%	Very low	Maximum
Bulky metal cargo containers, thick metal items	Impractical for shipboard compaction ; not feasible	Not applicable	Not applicable	Not applicable	Maximum

5.2 Grinding or comminution

When not in a special area, the discharge of comminuted food wastes and all other comminuted garbage (except plastics and floatable dunnage, lining and packing materials) may be permitted under regulation 3(1)(c) of Annex V beyond 3 nautical miles from the nearest land. Such comminuted or ground garbage must be capable of passing through a screen with openings no greater than 25 mm unless such comminutors or grinders comply with international or governmentally accepted standards which effectively accomplish this. It is recommended that garbage not be discharged into a ship's sewage treatment system unless it is approved for treating such garbage. Furthermore, garbage should not be stored in bottoms or tanks containing oily wastes. Such actions can result in faulty operation of sewage treatment or oily-water separator equipment and can cause

sanitary problems for crew members and passengers. Options for grinding or comminution include the following:

5.2.1 A wide variety of food waste grinders are available in the market and are commonly fitted in most modern ships' galleys. These food waste grinders produce a slurry of food particles and water that washes easily through the required 25 mm screen. Output ranges from 10 to 250 litres per minute. It is recommended that the discharge from shipboard comminuters be directed into a holding tank when the vessel is operating within an area where discharge is prohibited.

5.2.2 Size reduction of certain other garbage items can be achieved by shredding or crushing and machines for carrying out this process are available for use on board ships.

5.2.3 Information on the development and use of comminuters for garbage aboard ships should be forwarded to the Organization.

5.3 Table 3 shows compaction options for various types of garbage.

5.3.1 Most garbage can be compacted; the exceptions include unground plastics, fibre and paper board, bulky cargo containers and thick metal items. Pressurized containers should not be compacted since they present an explosion hazard.

5.3.2 Compaction can reduce the volume of garbage into bags, boxes, or briquettes. When these compacted slugs are equally formed and structurally strong, they can be piled up in building block form; this permits the most efficient use of space in the storage compartments. The compaction ratio for normal mixed shipboard garbage may range as high as 12: 1.

5.3.3 Some of the available compactors have options such as sanitizing, deodorizing, adjustable compaction ratios, bagging in plastic or paper, boxing in cardboard (with or without plastic or wax paper lining), baling, etc. Paper or cardboard tends to become soaked and weakened by moisture in the garbage during long periods of on-board storage. There have also been problems due to the generation of gas and pressure which can explode tight plastic bags.

5.3.4 If grinding machines are used prior to compaction, the compaction ratio can be increased and the storage space decreased.

5.3.5 A compactor should be installed in a compartment with adequate room for operating and maintaining the unit and storing trash to be processed. The compartment should be located adjacent to the areas of food processing and commissary store-rooms. If not already required by regulation it is recommended that the space have freshwater washdown service, coamings, deck drains, adequate ventilation and hand or automatic fixed fire-fighting equipment.

5.3.6 Information on the development and use of shipboard compactors should be forwarded to the Organization.

5.4 In comparison with the technology of land-based incineration, the state of the art in marine incinerators is not highly advanced, primarily because the technology has not yet been subject to

constraints on air emissions nor to the types of materials that could be incinerated. Marine incinerators in current and typically do not include any provisions for air pollution control. Control of air pollution is normally required in many ports in the world. Prior to using an incinerator while in port, permission may be required from the port authority concerned. In general, the use of shipboard garbage incinerators in ports in or near urban areas should be discharged as their use will add to possible air pollution in these areas. Special considerations for incinerators are listed below:

5.4.1 Table 4 presents options for incineration of garbage, including considerations for special handling by vessel personnel, combustibility, reduction of volume, residual materials, exhaust, and on-board storage space. Most garbage is amenable to incineration with the exception of metal and glass.

Table-4 Incineration options for shipboard-generated garbage

Typical examples	Special handling by vessel personnel before incineration	Incineration characteristics				On-board storage space
		Combustibility	Reduction of volume	Residual	Exhaust	
Paper Packing, food and beverage containers	Minor-easy to feed into hopper	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum
Fibre and paper board	Minor - reduce material to size for feed, minimum manual labour	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum
Plastics packaging, food and beverage containers, etc.	Minor-easy to feed into hopper	High	Over 95%	Powder ash	Possibly smoky and not hazardous based on incineration design	Minimum
Plastics sheeting, netting, rope and bulk material.	Moderate manual labour time to size reduction	High	Over 95%	Powder ash	Possibly smoky and not hazardous based on incineration design	Minimum
Rubber hoses and bulk pieces	Major manual labour time to size reduction	High	Over 95%	Powder ash	Possibly smoky and not hazardous based on incineration design	Minimum

Metal food and beverage containers, etc.	Minor-easy to feed into hopper	Low	Less 10%	Slag	Possibly smoky and not hazardous	Moderate
Metal cargo, bulky containers, thick metal items	Major manual labour time to size reduction(not easily incinerated)	Very low	Less 5%	LargemetalFragments andslag	Possibly smoky and not hazardous	Maximum
Glass food and beverage containers, etc.	Minor-easy to feed into hopper	Low	Less 10%	Slag	Possibly smoky and not hazardous	Moderate
Wood, cargo containers and large wood scrapes	Moderate manual labour time to size reduction	High	Over 95%	Powderash	Possibly smoky and not hazardous	Minimum

5.4.2 In contrast to land-based incinerators, shipboard incinerators must be as compact as practicable, and with operating personnel at a premium, automatic operation is desirable. Most shipboard incinerators are designed for intermittent operation: the waste is charged to the incinerator, firing is started, and combustion typically lasts for three to six hours.

5.4.3 Commercial marine incinerators currently available vary greatly in size, have natural or induced draught, and are hand fired. It should be noted that incinerator ratings are usually quoted on the basis of heat input rate rather than on a weight charged basis because of the variability of the heat content in the wastes. Some modern incinerators are designed for continuous firing, and can handle simultaneous disposal of nearly all shipboard waste.

5.4.4 Some of the advantages of the most advanced incinerators may include that they operate under negative pressure, they are highly reliable since they, have few moving parts, they require minimal operator skill, they are low in weight, and they have low exhaust and external skin temperatures.

5.4.5 Some of the disadvantages of incinerators may include the possible hazardous nature of the ash or vapour, dirty operation, excessive labour required for charging, stoking and ash removal, and they may not meet air pollution regulation imposed in certain harbours. Some of these disadvantages can be remedied by automatic equipment of charging, stoking and ash discharge into the sea outside areas

where such discharge is prohibited. The additional equipment to perform these automatic functions requires more installation space.

5.4.6 The incineration of predominantly plastic wastes, as might be considered under some circumstances in complying with Annex V, requires more air and much higher temperatures for complete destruction. If plastics are to be burnt in a safe manner, the incinerator should be suitable for the purpose, otherwise the following problems can result:

5.4.6.1 Depending on the type of plastic and conditions of combustion, some toxic gases can be generated in the exhaust stream, including vaporized hydrochloric(HCL) and hydrocyanic(HCN) acids. These and other intermediary products of plastic combustion can be extremely dangerous.

5.4.6.2 The ash from the combustion of some plastic products may contain heavy metal or other residues which can be toxic and should therefore not be discharged into the sea. Such ashes should be retained on board and discharged at port reception facilities.

5.4.6.3 The temperatures generated during incineration of primarily plastic wastes are high enough to possibly damage some garbage incinerators.

5.4.6.4 Plastic incineration requires three to ten times more combustion air than average municipal refuse. If the proper level of oxygen is not supplied, high levels of soot will be formed in the exhaust stream.

5.4.7 Shipboard incinerators should be designed, constructed, operated and maintained in accordance with the Standard Specification for Shipboard Incinerators set out in Appendix 2.

5.4.8 Information on the development and utilization of marine garbage incinerator systems for shipboard use should be forwarded to the Organization.

6. Port reception facilities for garbage

6.1 The methodology for determining the adequacy of a reception facility should be based on the needs of each type of ship, as well as the number and types of ships using the port. The size and location of a port should be considered in determining adequacy. Emphasis should also be made on calculating the quantities of garbage from ships which are not discharged to the sea in accordance with the provisions of regulations 3, 4 and 5 of Annex V.

6.2 It should be noted that, due to possibly existing different procedures for reception, port reception may require separation on board of;

6.2.1 food wastes (e.g. raw meat because of risk of animal diseases);

6.2.2 cargo-associated wastes; and

6.2.3 domestic waste and maintenance waste.

6.3 Estimates of quantities of garbage to be received

6.3.1 Vessel, port and terminal operators should consider the following when determining quantities of garbage on a per ship basis:

6.3.1.1 type of garbage;

6.3.1.2 ship type and design;

6.3.1.3 ship operating route;

6.3.1.4 number of persons on board;

6.3.1.5 duration of voyage;

6.3.1.6 time spent in areas where discharge into the sea is prohibited or restricted; and

6.3.1.7 time spent in port.

6.3.2 Governments, in assessing the adequacy of reception facilities, should also consider the technological problems associated with the treatment and disposal of garbage received from ships. Although the establishment of waste management standards is not within the scope of the Convention, governments should take responsible actions within their national programmes to consider such standards.

6.3.2.1 The equipment for treatment and disposal of garbage is a significant factor in determining the adequacy of a reception facility. It not only provides a measure of the time required to complete the process, but it also is the primary means for ensuring that ultimate disposal of the garbage is environmentally safe.

6.3.2.2 Governments are urged to initiate, at the earliest opportunity, studies into the provision of reception facilities at ports in their respective countries. Governments should carry out the studies in close co-operation with port authorities and other local authorities responsible for garbage handling. Such studies should include information such as a port-by-port listing of available garbage reception facilities, the types of garbage they are equipped to handle (e.g. food wastes contaminated with foreign disease or pest organisms, large pieces of derelict fishing gear, or refuse and operational wastes only), their capacities and any special procedures required to use them. Governments should transmit the results of their studies to the Organization for inclusion in the Annex V library (see section 2.2).

6.3.2.3 While selecting the most appropriate type of reception facility for a particular port, consideration should be given to several alternative methods available. In this regard, floating plants for collection of garbage, such as barges or self-propelled ships, might be considered more effective in a particular location than land-based facilities.

6.3.3 The purpose of these guidelines will be attained if they can provide the necessary stimulus to governments to initiate, and continue studies of, reception facilities as well as treatment and disposal technology. Information on development in the this respect should be forwarded to the Organization.

7 Ensuring compliance with Annex V

Recognizing that direct enforcement of Annex V regulations, particularly at sea, is difficult to accomplish, governments are encouraged to consider not only restrictive and punitive measures but also the removal of any disincentives, creation of positive incentives, and the development of voluntary measures within the regulated community when developing programmes and domestic legislation to ensure compliance with Annex V.

7.1 Enforcement

7.1.1 Governments should encourage their flag vessels to advise them of ports in foreign countries Party to Annex V which do not have port reception facilities for garbage. This will provide a basis for advising responsible governments of possible problems and calling the Organization's attention to possible infractions. An acceptable reporting format is reproduced in the attached appendix.

7.1.2 Governments should establish a documentation system (e.g. letters or certificates) for ports and terminals under its jurisdiction, stating that adequate facilities are available for receiving ship-generated garbage. Periodic inspection of the reception facilities is recommended.

7.1.3 Governments should identify appropriate enforcement agencies, providing legal authority, adequate training, funding and equipments to incorporate the enforcement of Annex V regulations into their responsibilities. In those cases where customs or agricultural officials are responsible for receiving and inspecting garbage, governments should ensure that the necessary inspections are facilitated as much as possible.

7.1.4 Governments should consider, where applicable, the use of garbage discharge reporting systems (e.g. existing ship's deck log-book or record book) for ships. Such logs, at a minimum, should document the date, time, location by latitude and longitude, or name of port, type of garbage (e.g. food refuse, cargo-associated waste or maintenance waste) and estimated amount of garbage discharged. Particular attention should be given to the reporting of:

7.1.4.1 the loss of fishing gear;

7.1.4.2 the discharge of cargo residues;

7.1.4.3 any discharge in special areas;

7.1.4.4 discharge at port reception facilities; and

7.1.4.5 discharge of garbage at sea.

7.1.5 The issue of documents or receipts by port reception facilities might also assist the reporting system.

7.2 Compliance incentive systems

7.2.1 The augmentation of port reception facilities to serve ship traffic without undue delay or inconvenience may require capital investment from port and terminal operators as well as the waste management companies serving those ports. Governments are encouraged to evaluate means within their authority to lessen this impact, thereby helping to ensure that garbage delivered to port is actually received and disposed of properly at reasonable cost or without charging special fees to individual ships. Such means include, but are not limited to:

7.2.1.1 tax incentives;

7.2.1.2 loan guarantees;

7.2.1.3 public vessel business preference;

7.2.1.4 special funds to assist in problem situations such as remote ports with no land-based waste management system in which to deliver ships' garbage;

7.2.1.5 government subsidies; and

7.2.1.6 special funds to help defray the cost of a bounty programme for lost, abandoned or discarded fishing gear or other persistent garbage. The programme would make appropriate payments to persons who retrieve such fishing gear, or other persistent garbage other than their own, from marine wasters under the jurisdiction of government.

7.2.2 The installation of shipboard garbage processing equipment would facilitate compliance with Annex V and lessen the burden on port reception facilities to process garbage for disposal. Therefore, governments should consider actions to encourage certain types of garbage processing equipment to be installed on ships operating under its flag. For example, programmes to lessen costs to shipowners for purchasing and installing such equipment, or requirements for installing compactors, incinerators and comminuters during construction of new ships would be very helpful.

7.2.3 Governments are encouraged to consider the economic impacts of domestic regulations intended to force compliance with Annex V. Unrealistic regulations may lead to higher levels of non-compliance than an education programme without specific regulatory requirements beyond Annex V itself. Due to the highly variable nature of ship operations and configurations, it seems appropriate to maintain the highest possible level of flexibility in domestic regulations to permit ships the greatest range of options for complying with Annex V.

7.2.4 Governments are encouraged to support research and development of technology that will simplify compliance with Annex V regulations for ships and ports. This research should concentrate on:

7.2.4.1 shipboard waste handling systems;

7.2.4.2 ship provision innovations to minimize garbage generation;

7.2.4.3 loading and unloading technology to minimize dunnage, spillage and cargo residues; and

7.2.4.4 new ship construction design to facilitate garbage management and transfer.

7.2.5 Governments are encouraged to work within the Organization to develop port reception systems that simplify the transfer of garbage for international vessels.

7.3 Voluntary measures

7.3.1 Governments are encouraged to assist ship operators and seafarers' organizations in developing resolutions, by-laws and other internal mechanisms that will encourage compliance with Annex V regulations. Some of these groups include:

7.3.1.1 seamen's and officers' unions;

7.3.1.2 associations of shipowners and insurers, and classification societies; and

7.3.1.3 pilot associations, fishermen's organizations.

7.3.2 Governments are encouraged to assist and support, where possible, the development of internal systems to promote compliance with Annex V in port authorities and associations, terminal operators's organizations, stevedores' and longshoremen's unions and land-based waste management authorities.

Appendix

Form for reporting alleged inadequacy of port reception facilities for garbage

1. Country

Name of port or area

Location in the port (e.g. berth/terminal/jetty)

Date of incident

2. Type and amount of garbage for discharge to facility :

a. Total amount :

food waste m³

cargo-associated waste m³

maintenance waste m³

other m³

b. Amount not accepted by the facility :

food waste m³

cargo-associated waste m³

maintenance waste m³

other m³

3. Special problems encountered :

Undue delay

Inconvenient location of facilities

Unreasonable charge for use of facilities

Special national regulations

Other

4. Remarks : (e. g. information received from port authorities or operators of reception facilities : reasons given concerning 2 above)

5. Ship's particulars

Name of ship

Owner or operator

Distinctive number or letters

Port of registry

Number of persons on board

.....

Date of completion of form

Signature of master

