

INTERNATIONAL REGULATIONS FOR THE PREVENTION AND
CONTROL OF POLLUTION BY DEBRIS FROM SHIPS

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(The views expressed herein are those of the authors and are not necessarily those of the International Maritime Organization.)

ABSTRACT

The amount of solid wastes entering the world's oceans each year is estimated to be in millions of metric tons. The sea floor, water surface, and beaches of the Earth's marine environment are littered with man-made materials. Studies show that most of the refuse washed up on beaches comes from ships. The International Maritime Organization, being responsible for the prevention and control of marine pollution from ships, adopted in 1973 the International Convention for the Prevention of Pollution from Ships. This convention, as modified by the 1978 Protocol hereafter referred to as MARPOL 73/78, applies to any ship of any type whatsoever. It covers all aspects of intentional pollution from ships by oil (Annex I), noxious substances carried in bulk (Annex II), or in packaged forms (Annex III), sewage (Annex IV), and garbage (Annex V).

The Annex V of MARPOL 73/78, entitled "Regulations for the Prevention of Pollution by Garbage from Ships," entered into force on 31 December 1988. In order to assist governments in developing and enacting domestic laws which would implement Annex V, the Marine Environment Protection Committee of the International Maritime Organization developed the Guidelines for the Implementation of Annex V of MARPOL 73/78. The guidelines are discussed in this paper.

INTRODUCTION

A considerable amount of debris originating from ships is disposed of at sea. Garbage from ships has traditionally been dumped into the sea as a matter of course and in proportion to the amount of similar wastes poured into the sea each year from the land. The quantities of waste disposed of in this way in the past are not considered excessive.

Today, however, the situation is very different. One reason is the growing everyday use of substances such as plastics which are nonbiodegradable: Once thrown into the sea, they are extremely persistent and potentially harmful if ingested by seabirds and marine mammals. Also, the aesthetic quality of coastlines and beaches has been devalued by the accumulation of such wastes.

Studies carried out in the United Kingdom by The Tidy Britain Group in 1978-79 showed that most of the refuse washed up on British beaches came from ships. Of some 20,000 items recovered, 42% were plastic (mostly containers of household products such as disinfectants, bleach, and washing-up liquid) and 22% metal. Of the latter, more than two-thirds turned out to be drink cans (International Maritime Organization (IMO) 1988b).

The amount of wastes generated by ships can be prodigious. A study carried out by a marine biologist at Newcastle University in 1982 showed that during a 44-day voyage, the 46 members of a merchant ship's crew dumped overboard 320 cardboard or paper boxes, 370 plastic beer-can holders, 162 crisp packets, 19 plastic bags, 2 plastic drums, 240 bottles, 5 glasses, 5,176 cans, and 2 metal drums. Not surprisingly perhaps, the same survey showed that of 600 ships entering ports in South Wales in 1977-78, only 13.5% used the waste disposal facilities provided on shore (Jones et al. 1981).

More recently, a survey carried out in the German Bight showed that the minimum amount of refuse drifting between Helgoland and the Elbe estuary is approximately 8.5 million pieces annually with a weight of 1,300 metric tons (MT), and 95% of the refuse found could be attributed to shipping (Vauk et al. 1987). In the Mediterranean, litter generated by shipping and oil drilling has been estimated at 325×10^6 kg/year. The total amount of litter generated in the world's oceans each year, assuming all ships' solid wastes are disposed of overboard, has been estimated at 6.5×10^6 MT/annum (Dixon and Dixon 1983).

According to the Center for Environmental Education (1986), the worldwide rate of disposal of domestic litter from merchant ships has been estimated at 110,000 MT, 0.7% of which is plastic. The amount of cargo-associated wastes including dunnage, shoring, pallets, wires, and covers is estimated at 5.6 million MT per year. Our considerations are limited to prevention of marine pollution from ships.

REGULATIONS DEVELOPED BY THE INTERNATIONAL MARITIME ORGANIZATION

To mitigate and control or even eliminate operational discharge from ships into the sea of all kinds of wastes including disposal of garbage, the IMO adopted in 1973 the International Convention for the Prevention of Pollution from Ships. This convention as modified by the 1978 Protocol (MARPOL 73/78) applies to any ship of any type whatsoever including hydrofoil boats, air-cushion vehicles, submersibles, floating rafts, and fixed or floating platforms operating in the marine environment. It covers all

aspects of intentional pollution from ships by oil (Annex I), noxious substances carried in bulk (Annex II) or in packaged forms (Annex III), sewage (Annex IV), and garbage (Annex V). (Annex V is attached as Appendix A.)

As of 8 February 1989, 55 states--the combined merchant fleets of which constitute 80.92% of gross tonnage of the world's merchant shipping--ratified the convention.

The Annexes III, IV, and V of MARPOL 73/78 are so-called "optional annexes." Each of them enters into force 12 months after the date on which at least 15 states with a combined merchant fleet of at least 50% of the gross tonnage of the world's merchant shipping have accepted it. With respect to Annex V, these conditions were fulfilled in December 1987, and subsequently, in accordance with the provisions of article 15(2) of the MARPOL Convention, this annex entered into force on 31 December 1988.

Thirty-nine states--the combined merchant fleets of which constitute 56.6% of gross tonnage of the world's merchant shipping--ratified Annex V. As of 8 February 1989, the states that have accepted Annex V are: Algeria, Antigua and Barbuda, Austria, Belgium, China, Colombia, Cote d'Ivoire, Czechoslovakia, Democratic People's Republic of Korea, Denmark, Egypt, Finland, France, Gabon, German Democratic Republic, Federal Republic of Germany, Greece, Hungary, Italy, Japan, Lebanon, Marshall Islands, Netherlands, Norway, Oman, Panama, Peru, Poland, Portugal, St. Vincent and Grenadines, Suriname, Sweden, Tunisia, Tuvalu, United Kingdom, U.S.S.R., United States, Uruguay, and Yugoslavia.

ANNEX V

The purpose of Annex V, in particular, is to prevent pollution caused by dumping into the sea all kinds of solid waste garbage, which includes inter alia all plastics, synthetic ropes, synthetic fishing nets, and plastic garbage bags. Disposal into the sea of all plastics is completely prohibited in all areas. However, some other forms of garbage may be disposed of at sea under strictly controlled conditions.

Dunnage, lining, and packing materials can only be disposed of at sea more than 25 nmi from land. Food wastes and all other garbage (including paper products, rags, glass, metal, bottles, and crockery) cannot be disposed of at sea within 12 nmi of land. Even stricter controls apply in sea areas called "special areas." For the purpose of Annex V, the special areas are: The Mediterranean Sea Area, the Baltic Sea Area, the Black Sea Area, the Red Sea Area, and the Gulfs Area. The Gulfs Area means the sea area located northwest of the rhumb line between Ras al Hadd (lat. 22°30'N, long. 59°48'E) and Ras al Fasteh (lat. 25°04'N, long. 61°25'E).

In order for ships to fully comply with the requirements on disposal of garbage within the special areas, they should be provided at ports and terminals in that area with facilities for the reception of garbage, without causing undue delay to ships.

Therefore, the government of each party to the convention whose coastline borders a special area is obliged to ensure that as soon as possible in all ports within the area, adequate reception facilities will be provided in accordance with Annex V regulations, taking into account the special needs of ships operating therein.

The IMO, after receiving notification from all governments of the states bordering a special area where adequate reception facilities have been provided, establishes the date when the requirements of the regulations on special areas shall take effect.

So far, only the states of the Baltic Sea Area (Denmark, Finland, German Democratic Republic, Federal Republic of Germany, Poland, Sweden, and U.S.S.R.) have notified IMO that requirements concerning provision of adequate reception facilities in that area have been fulfilled. The IMO notified all parties to the convention that 1 October 1989 was the established date, and starting on that date, the requirements on disposal of garbage within the Baltic Sea Area took effect (Resolution Marine Environment Protection Committee (MEPC) 31(26) adopted on 9 September 1988).

The establishment of special requirements for disposal of garbage from fixed and floating platforms is incorporated in Annex V. The disposal of any materials regulated by Annex V is completely prohibited from fixed and floating platforms which are engaged in exploration, exploitation, and associated offshore processing of seabed mineral resources, and from all other ships when alongside or within 500 m of such platforms.

The exception is the disposal into the sea of food wastes, which are permitted when they have been passed through a comminuter or grinder, but only when such fixed or floating platforms are located more than 12 nmi from land and all other ships are alongside or within 500 m of such platforms.

Limitations on the discharge of garbage from ships, as specified in Annex V, are summarized in Table 1.

GUIDELINES FOR THE IMPLEMENTATION OF ANNEX V OF MARPOL 73/78

The MEPC of the IMO at consecutive sessions in 1987 and 1988 considered the problem of implementation of Annex V. The working groups on optional annexes, under the chairmanship of T. A. Wastler for the 24th and 25th sessions and D. B. Pascoe for the 26th session, both chairmen from the United States, worked on the development of the Guidelines for the Implementation of Annex V of MARPOL 73/78, which were approved at the 26th session of MEPC, 5-9 September 1988 (IMO 1988a).

The main objectives of these guidelines are to (1) assist governments which have ratified Annex V in developing and enacting domestic laws which give force to and implement Annex V; (2) assist vessel operators in complying with the requirements set forth in Annex V and domestic laws;

Table 1.--Summary of at-sea garbage disposal regulations, MARPOL, Annex V.

Garbage type	All ships except platforms ^a		Offshore platforms ^a
	Outside special areas	In special areas ^b	
Plastics--includes synthetic ropes and fishing nets and plastic garbage bags	Disposal prohibited	Disposal prohibited	Disposal prohibited.
Floating dunnage, lining, and packing materials	>25 nmi from nearest land	Disposal prohibited	Disposal prohibited.
Paper, rags, glass, metal, bottles, crockery, and similar refuse	>12 nmi from nearest land	Disposal prohibited	Disposal prohibited.
All other garbage including paper rags, glass, etc., comminuted or ground	>3 nmi from nearest land	Disposal prohibited	Disposal prohibited.
Food waste not comminuted or ground	>12 nmi from nearest land	>12 nmi from nearest land	Disposal prohibited.
Food waste comminuted or ground ^c	>3 nmi from nearest land	>12 nmi from nearest land	>12 nmi from nearest land.
Mixed refuse types	(d)	(d)	(d)

^aOffshore platforms and associated ships include all fixed or floating platforms engaged in exploration or exploitation of seabed mineral resources, and all ships alongside or within 500 m of such platforms.

^bGarbage disposal regulations for special areas shall take effect in accordance with regulation 5(4)(b) of Annex V.

^cComminuted or ground garbage must be able to pass through a screen with mesh size no larger than 25 mm.

^dWhen garbage is mixed with other harmful substances having different disposal or discharge requirements, the most stringent disposal requirements shall apply.

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

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.

The guidelines are divided into seven categories that provide a general framework upon which governments will be able to formulate programs for education and training of seafarers and others who must 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.

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 IMO continue to gather information and review these guidelines periodically.

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 as follows:

- "Food waste" is any spoiled or unspoiled victual substance such as fruits, vegetables, dairy products, poultry, meat products, food scraps, food particles, and all other material contaminated by such waste generated aboard ship, principally in the galley and dining areas.
- "Plastic" is any solid material which contains as an essential ingredient one or more synthetic organic high polymers and which is formed (shaped) by heat and/or pressure during either manufacture of the polymer or its fabrication into a finished product. 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 (vapor-proof barriers, bottles, containers, liners), ship construction (fiberglass 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, and rope and line.
- "Domestic waste" includes all types of food wastes and wastes generated in the living spaces on board ship.
- "Cargo-associated waste" is all materials which have become wastes as a result of use for cargo stowage and handling on board ship. Cargo-associated waste includes but is not

limited to dunnage, shoring, pallets, lining and packing materials, plywood, paper, cardboard, wire, and steel strapping.

- "Maintenance waste" is materials collected by the engine and deck departments while maintaining and operating the vessel, such as soot, machinery deposits, scraped paint, deck sweeping, wiping wastes, and rags.
- "Operational waste" is all cargo-associated waste and maintenance waste, and cargo residues defined as garbage in "Cargo residues" (see below).
- "Dishwater" is the residue from the manual or automatic washing of dishes and cooking utensils which have been precleaned to the extent that any food particles adhering to them would not normally interfere with the operation of automatic dishwashers. "Gray water" is drainage from dishwater, shower, laundry, bath, and washbasin drains and does not include drainage from toilets, urinals, hospitals, and animal spaces or drainage from cargo spaces.
- "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.
- "Cargo residues," for the purposes of these guidelines, are defined as 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). Cargo residues are expected to be in small quantities.
- "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.
- "Seafarer," 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 seabed mineral resources, fishing, and recreation.

In order to clarify the application of Annex V, the following comments and explanations were added.

- Dishwater and gray water are not included as garbage in the context of Annex V.
- Ash and clinkers from shipboard incinerators and coal burning boilers 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 Regulations 3(1)(b)(ii) and 5(2)(a)(ii).
- 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.
- 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 because of their possible safety hazards may not be suitable for disposal at reception facilities equipped to handle general garbage. 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.

The remaining sections of the guidelines follow.

Training, Education, and Information

The definition of "ships" used in the convention requires these guidelines address not only the professional and commercial maritime community but also the noncommercial seafaring population as sources of pollution of the sea by garbage. Uniform programs in the field of training and education will 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 programs suited for all seafaring communities under their jurisdictions.

Governments may exchange and maintain information relevant to compliance with Annex V regulations through the IMO. Accordingly, governments are encouraged to provide the organization with the following:

- Technical information on shipboard waste management methods such as recycling, incineration, compaction, sorting and sanitation systems, packaging, and provisioning methods.
- Copies of current domestic laws and regulations relating to the prevention of pollution of the sea by garbage.
- Educational materials developed to raise the level of compliance with Annex V. Contributions of this type include printed materials, posters, brochures, photographs, audio-

and videotapes, and films as well as synopses of training programs, seminars, and formal curriculums.

- 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.

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.

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 x 20 cm made of durable material and fixed in a conspicuous place in galley spaces, 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.

Governments are encouraged to have maritime colleges and technical institutes under their jurisdiction develop or augment curriculums to include both the legal duties and the technical options for handling ship-generated garbage available to professional seafarers. These curriculums should also include information on environmental impacts of garbage. Suggested topics are listed below:

- Garbage in the marine environment, sources, types, and impacts.
- National and international laws related to or impinging upon shipboard waste management.
- Health and sanitation considerations related to the storage, handling, and transfer of ship-generated garbage.
- Current technology for onboard and shoreside processing of ship-generated garbage.
- Provisioning options, materials, and procedures to minimize the generation of garbage aboard ship.

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.

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

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

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

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 government.

The subjects addressed in these programs 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 seabirds, fish, marine mammals, sea turtles, and ship operations; impacts on coastal tourist trade; current actions by governments and private organizations; and sources of additional information.

Minimizing the Amount of Potential Garbage

All ship operators should minimize the taking aboard of potential garbage and onboard generation of garbage.

Domestic wastes may be minimized through proper provisioning practices. Ship operators and governments should encourage ship's 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:

- Bulk packaging of consumable items. This may result in the creation of less waste, but factors such as inadequate shelf life once a container is opened must be considered to avoid increasing wastes.
- Reusable packaging and containers. This can decrease the amount of garbage being generated. Use of disposable cups,

utensils, dishes, towels and rags, and other convenience items should be limited.

- Provisions packaged in or made of materials other than disposable plastic. These should be selected to replenish ship supplies unless a reusable plastic alternate is available.

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 actions as needed to minimize their generation. Suggested actions are listed below.

- Replace disposable plastic sheeting used for cargo protection with permanent, reusable covering materials.
- Adopt stowage systems and methods that reuse coverings, dunnage, shoring, lining, and packing materials.
- Dispose of dunnage, lining, and packaging materials generated in port during cargo discharge at the port reception facilities and do not retain it on board for discharge at sea.

It may, in certain cases, be difficult for port reception facilities to handle cargo residues. They are usually created through inefficiencies in loading, unloading, and onboard handling, and it is, therefore, recommended that cargo be unloaded as efficiently as possible in order to avoid or minimize cargo residues.

Spillage of the cargo during transfer operations should be carefully controlled, both on board and from dockside. 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 so that the residues are easily recovered.

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 its recovery are listed below.

- 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 systems where necessary.

- Fishery managers are encouraged to consider the probability of encounters between ship traffic and fishing gear when establishing seasons, areas, and gear-type regulations.
- Fishery managers and fishing vessel operators and associations are encouraged to utilize gear identification systems which provide information such as vessel name, registration number, and nationality. Such systems may be useful to promote reporting, recovery, and return of lost gear.
- 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, trawls, and gillnets could be designed to have degradable panels or sections made of natural fiber twine, wood, or wire.
- Governments are encouraged to consider the development of technology for more effective fishing gear identification systems.

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

- Development of recycling technology and systems for synthetic materials returned to shore as garbage.
- 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.

Shipboard Garbage Handling and Storage Procedures

Compliance with limitations on the discharge of garbage from ships as specified in Annex V 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.

In complying with the provisions of Annex V, the most appropriate procedures for handling and storing garbage on ships 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. Proper handling and storage minimize shipboard storage space requirements and enable efficient transfer of retained garbage to port reception facilities.

To ensure that the most effective and efficient handling and storage procedures are followed, it is recommended that vessel operators develop waste management plans that can be incorporated into crew and vessel operating manuals. Such plans should include the appointment of an environmental control officer. The manuals should identify crew responsibilities 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 disposal of ship-generated garbage is presented in Table 2. Specific procedures for each phase are discussed below.

Collection

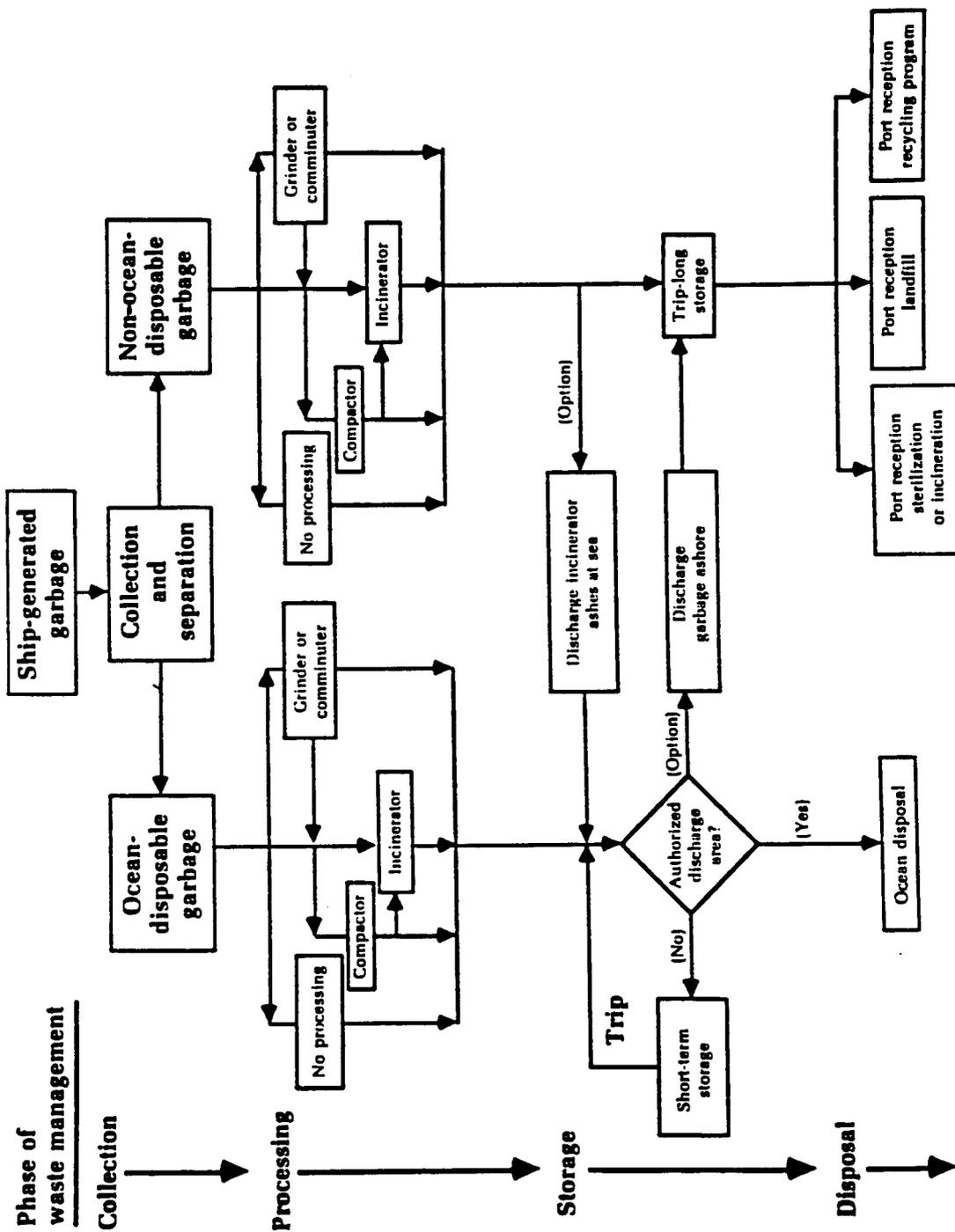
Procedures for collecting garbage generated aboard ship should be based on consideration of what can be discarded overboard while en route. To reduce or avoid the need for sorting after collection, it is recommended that three categories of distinctively marked garbage receptacles be provided to receive garbage as it is generated. These separate receptacles (e.g., cans, bags, or bins) would receive (1) plastics and plastics mixed with nonplastic 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 color, 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.

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 provided receptacles, proceeds generated from their return might be added to a ship's recreational fund.

Plastics and plastics mixed with nonplastic 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.

Synthetic fishing net and line scraps generated by the repair or operation of fishing gear may not be discarded at sea and should be

Table 2.--Options for shipboard handling and disposal of garbage.



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 odor or great volume.

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 packaging and disposable eating utensils). These regulations 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 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.

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 (Table 1). Such garbage should be kept separate from other garbage and preferably retained for disposal in port.

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

Recovery of garbage at sea.--Fishermen and other seafarers who recover derelict fishing gear and other persistent garbage during routine operations are encouraged to retain this 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.

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

Processing

Depending on factors such as the type of ship, area of operation, and size of crew, ships may be equipped with incinerators, compactors, comminuters, or other devices for shipboard garbage processing (see "Shipboard Equipment for Processing Garbage" below). Members of the crew should be assigned responsibility for operating this equipment on a schedule commensurate with ship needs. In selecting appropriate processing procedures, consider that compactors, incinerators, comminuters, and other such devices have a number of advantages, such as making it possible to discharge certain garbage at sea, reducing shipboard space requirements for storing

garbage, making it easier to off-load garbage in port, and enhancing assimilation of garbage discharged into the marine environment.

It should be noted that special rules on incineration may be established by authorities in some ports and may exist in some special areas. Incineration of the following items requires special precaution due to the potentially harmful environmental and health effects from combustion of by-products: Hazardous materials (e.g., scraped paint, impregnated wood) and certain types of plastics (e.g., polyvinyl chloride-based plastics). The problems of combustion of by-products are discussed in the section entitled "Shipboard Equipment for Processing Garbage."

Ships operating primarily in special areas or within 3 nmi of the nearest land should choose between storage of either compacted or uncompact materials 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.

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 also may sink more readily, which would reduce aesthetic impacts in coastal waters and along beaches and perhaps reduce the likelihood of marine life ingesting or otherwise interacting with discharged materials.

Ships operating primarily beyond 3 nmi 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 25 mm. Although larger food scraps may be discharged beyond 12 nmi, 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.

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 storage or no storage. In all cases, garbage should be stored in a manner which avoids health and safety hazards. The following points should be considered when selecting procedures for storing garbage:

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

- 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.
- 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.
- Waste fishing gear can be stored on deck if materials have strong odors 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.
- Disinfection and both preventive and remedial pest control methods should be applied regularly in garbage storage areas.

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:

- 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 nmi 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 deep water (50 m or more) to prevent rapid loss of their structural integrity due to wave action and currents.
- Floating cargo-associated waste that is not plastic or otherwise regulated under other MARPOL annexes may be discharged beyond 25 nmi from the nearest land. Cargo-associated waste that will sink and is not plastic or otherwise regulated may be discharged beyond 12 nmi from the nearest land. Most cargo-associated waste is generated during the loading and unloading process, usually at

dockside. It is recommended that every effort be made to deliver these wastes to the nearest port reception facility prior to the ship's departure.

- 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.
- 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.

Shipboard Equipment for Processing Garbage

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

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 nmi from the nearest land. It is recommended that such comminuted or ground garbage not be discharged into a ship's sewage treatment system unless the system is approved for treating such garbage. Furthermore, it 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:

- 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 L/min. 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.

- 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.

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

Compaction

Table 3 gives compaction information for various types of garbage.

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

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.

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 waxed paper lining), and baling. Paper or cardboard tends to become soaked and weakened by moisture in the garbage during long periods of onboard storage. There have also been problems due to the generation of gas and pressure which can explode tight plastic bags.

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

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 storerooms. If not already required by regulations, it is recommended that the space have freshwater washdown service, coamings, deck drains, adequate ventilation, and hand or automatic fixed fire fighting equipment.

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

Incineration

Compared to 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 or on the types of materials that could be incinerated. Marine incinerators in current use are predominately designed for intermittent operation and hand stoking, and typically do not include any provisions for air pollution

Table 3.--Compaction guide for shipboard-generated garbage.

Typical examples	Special handling by vessel personnel before compaction	Compaction characteristics			Onboard storage space
		Rate of alteration	Retention of compacted form	Density of compaction form	
Metal food and beverage containers, glass, small wood pieces	None	Very rapid	Almost 100%	High	Minimum
Comminuted plastics, fiber and paper-board	Minor--reduce material to size for feed, minimal manual labor	Rapid	Approximately 80%	Medium	Minimum
Small metal drums, uncomminuted cargo packing, large pieces of wood	Moderate--longer manual labor time required to size material for feed	Slow	Approximately 50%	Relatively low	Moderate
Uncomminuted plastics	Major--very long manual labor 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

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 discouraged, as their use will add to possible air pollution in these areas.

Table 4 is a guide for incineration of garbage, including combustibility, reduction of volume, residual materials, exhaust, onboard storage space, and any required special handling by vessel personnel. With the exception of metal and glass, most garbage is amenable to incineration.

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 3 to 6 h.

Commercial marine incinerators currently available vary greatly in size, have natural or induced draft, 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.

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

Some of the disadvantages of incinerators are: The possible hazardous nature of the ash or vapor; dirty operation; excessive labor required for charging, stoking, and ash removal; and the probability of not meeting air pollution regulations imposed in certain harbors. Some of these disadvantages can be remedied by automatic equipment for charging, stoking, and discharging ash into the sea outside areas where such discharge is prohibited. The additional equipment to perform these automatic functions requires more installation space.

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

- 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.

Table 4.---Incineration^a guide for shipboard-generated garbage.

Typical examples	Incineration characteristics				Onboard storage space	
	Special handling by vessel personnel before incineration	Combustibility	Reduction of volume	Residual		Exhaust
Paper packaging, food and beverage containers	Minor--easy to feed into hopper	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum.
Fiber and paperboard	Minor--reduce material to size for feed; minimum manual labor	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum.
Plastic packaging, food and beverage containers	Minor--easy to feed into hopper	High	Over 95%	Powder ash	Possibly smoky and hazardous based on incinerator design	Minimum.
Plastic sheeting, netting, rope, and bulk material	Moderate manual labor time for size reduction	High	Over 95%	Powder ash	Possibly smoky and hazardous based on incinerator design	Minimum.
Rubber hoses and bulk pieces	Major manual labor time for size reduction	High	Over 95%	Powder ash	Possibly smoky and hazardous based on incinerator design	Minimum.
Metal food and beverage containers	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 labor time for size reduction (not easily incinerated)	Very low	Less 5%	Large metal fragments and slag	Possibly smoky and not hazardous	Maximum.
Glass food and beverage containers	Minor--easy to feed low into hopper	Low	Less	Slag	Possibly smoky and not hazardous	
Wood, cargo containers and large wood scraps	Moderate manual labor time for size reduction	High	Over 95%	Powder ash	Possibly smoky and not hazardous	Minimum.

^aCheck local rules for possible restrictions.

- 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 ash should be retained on board where possible, and discharged at port reception facilities.
- The high temperatures generated during incineration of primarily plastic wastes may damage some garbage incinerators.

Plastic incineration requires 3 to 10 times more combustion air than average municipal refuse. If the proper level of oxygen is not supplied, high levels of soot will form in the exhaust stream.

Certain ship classification societies have established requirements for the operation or construction of incinerators. The International Association of Classification Societies can provide information as to such requirements.

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

Port Reception Facilities for Garbage

Governments are urged to initiate at the earliest opportunity studies into the provision of reception facilities at ports in their respective countries. They should carry out the studies in close cooperation with port authorities and other local authorities responsible for garbage handling. Such studies should include information such as 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 provide the results of their studies to the organization for inclusion in the Annex V library.

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 such as barges or self-propelled ships might be considered more effective for collection of garbage in a particular location than land-based facilities.

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.

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 programs to consider such standards.

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 given to calculating the quantities of ship-generated garbage not discharged into the sea in accordance with the provisions of Regulations 3, 4, and 5 of Annex V.

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

- type of garbage,
- ship type and design,
- ship operating route,
- number of persons on board,
- duration of voyage,
- time spent in areas where discharge into the sea is prohibited or restricted, and
- time spent in port.

It should be noted that reception procedures may differ, and port reception may require onboard separation of food wastes (e.g., raw meat because of risk of animal diseases), cargo-associated waste, and domestic and maintenance waste.

The purpose of these guidelines will be attained if they provide the necessary stimulus to governments to initiate and continue studies of reception facilities and of treatment and disposal technology. Information on developments in this respect should be forwarded to the organization.

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 programs and domestic legislation to ensure compliance with Annex V.

Enforcement

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 IMO's attention to possible infractions. An acceptable reporting format is in Appendix B.

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

Governments should identify appropriate enforcement agencies providing legal authority, adequate training, funding, and equipment 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.

Governments should consider, where applicable, the use of garbage discharge reporting systems for ships (e.g., existing ship's deck logbook or record books). Such logs should, at a minimum, 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:

- the loss of fishing gear,
- the discharge of cargo residues,
- any discharge in special areas,
- discharge at port reception facilities, and
- discharge of garbage at sea.

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

Encouraging and Facilitating Compliance

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 costs or without charging special fees to individual ships. Such means include, but are not limited to:

- tax incentives;
- loan guarantees;
- public vessel business preference;
- special funds to assist in problem situations such as remote ports with no land-based waste management systems to receive ships' garbage;
- government subsidies and special funds to help defray the cost of a bounty program for lost, abandoned, or discarded fishing gear or other persistent garbage. The program would make appropriate payments to persons who retrieve such fishing gear or any persistent garbage other than their own from marine waters under the jurisdiction of a government.

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 the installation of certain types of garbage processing equipment on ships operating under their flag. For example, programs to lessen costs of purchasing and installing compactors, incinerators, and comminuters during construction of new ships would be very helpful.

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 noncompliance than would an education program 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 in complying with Annex V.

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:

- shipboard waste-handling systems;
- ship provision innovations to minimize garbage generation;
- loading and unloading technology to minimize dunnage, spillage, and cargo residues; and
- new ship construction design to facilitate garbage management and transfer.

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

Voluntary Measures

Governments are encouraged to assist ship operators' and seafarers' organizations in developing resolutions, bylaws, and other internal mechanisms that will encourage compliance with Annex V regulations. These groups include seamen's and officers' unions, associations of ship owners and insurers and classification societies, and pilot associations and fishermen's organizations.

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' organizations, stevedores' and longshoremen's unions, and land-based waste management authorities.

CONCLUSIONS

The legal framework for international cooperation in the protection of the marine environment from pollution caused by disposal into the sea of garbage from ships was given effect with the entry into force of Annex V of MARPOL 73/78 on 31 December 1988 (Marine Environment Protection Committee of the International Maritime Organization 1988).

First priority was given to the uniform implementation of Annex V through the development and enactment of enabling domestic laws. It is envisaged that the guidelines described in this paper will facilitate this process and improve the effectiveness of these measures to prevent pollution of the seas by garbage from ships.

The next step will necessarily be the encouragement of the widest possible acceptance and implementation of Annex V by states. The IMO Secretariat has integrated implementation of Annex V into its technical assistance Program for the Protection of Marine Environment. It can, therefore, be expected that global and regional workshops and seminars will be organized by IMO in cooperation with interested international and regional organizations with the aim of familiarizing experts, in particular those from developing countries, with the regulations and guidelines and providing advice on their implementation.

In 1981, the IMO assembly of its member states adopted Resolution A.500(XIII). The crux of this resolution is the agreement that it is undesirable to amend existing conventions unless they have been in force for a reasonable period of time and experience has been gained regarding the costs to the maritime industry of their operation and the burden on the legislative and administrative resources of IMO member states. The principle endorsed is that new conventions or amendments to existing conventions should be considered on the basis of a "clear and well-documented demonstration of compelling need."

After further practical experience has been gained with the implementation and enforcement of Annex V, there will doubtless be suggestions coming forth on strengthening the provisions of the annex and on further elaborating the guidelines. These suggested changes are likely to include:

- a requirement that individual waste management plans be developed for particular categories of vessels;
- a requirement that log entries be made for all waste garbage disposal practices to facilitate port control;
- requirements concerning standards of the garbage handling equipment to be installed on ships;
- a requirement concerning garbage separation on board ships; and
- guidelines on incineration of garbage on board ships.

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APPENDIX A

ANNEX V

REGULATIONS FOR THE PREVENTION OF POLLUTION
BY GARBAGE FROM SHIPS

Regulation 1

Definitions

For the purposes of this Annex:

(1) "Garbage" means all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention.

(2) "Nearest land". The term "from the nearest land" means from the baseline from which the territorial sea of the territory in question is established in accordance with international law except that, for the purposes of the present Convention "from the nearest land" off the north eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in

latitude 11°00' South, longitude 142°08' East to a point in
latitude 10°35' South,
longitude 141°55' East, thence to a point latitude 10°00' South,
longitude 142°00' East, thence to a point latitude 9°10' South,
longitude 143°52' East, thence to a point latitude 9°00' South,
longitude 144°30' East, thence to a point latitude 13°00' South,
longitude 144°00' East, thence to a point latitude 15°00' South,
longitude 146°00' East, thence to a point latitude 18°00' South,
longitude 147°00' East, thence to a point latitude 21°00' South,
longitude 153°00' East, thence to a point on the coast of Australia
in latitude 24°42' South, longitude 153°15' East.

(3) "Special area" means a sea area where for recognized technical reasons in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by garbage is required. Special areas shall include those listed in Regulation 5 of this Annex.

Regulation 2

Application

The provisions of this Annex shall apply to all ships.

Regulation 3

Disposal of Garbage Outside Special Areas

- (1) Subject to the provisions of Regulations 4, 5, and 6 of this Annex:
- (a) the disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags is prohibited;
 - (b) the disposal into the sea of the following garbage shall be made as far as practicable from the nearest land but in any case is prohibited if the distance from the nearest land is less than:
 - (i) 25 nautical miles for dunnage, lining and packing materials which will float;
 - (ii) 12 nautical miles for food wastes and all other garbage including paper products, rags, glass, metal, bottles, crockery and similar refuse;
 - (c) disposal into the sea of garbage specified in sub-paragraph (b)(ii) of this Regulation may be permitted when it has passed through a comminuter or grinder and made as far as practicable from the nearest land but in any case is prohibited if the distance from the nearest land is less than 3 nautical miles. Such comminuted or ground garbage shall be capable of passing through a screen with openings no greater than 25 millimetres.
- (2) When the garbage is mixed with other discharges having different disposal or discharge requirements the more stringent requirements shall apply.

Regulation 4

Special Requirements for Disposal of Garbage

- (1) Subject to the provisions of paragraph (2) of this Regulation, the disposal of any materials regulated by this Annex is prohibited from fixed or floating platforms engaged in the exploration, exploitation and associated offshore processing of seabed mineral resources, and from all other ships when alongside or within 500 metres of such platforms.
- (2) The disposal into the sea of food wastes may be permitted when they have been passed through a comminuter or grinder from such fixed or floating platforms located more than 12 nautical miles from land and all other ships when alongside or within 500 metres of such platforms. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25 millimetres.

Regulation 5

Disposal of Garbage Within Special Areas

(1) For the purposes of this Annex the special areas are the Mediterranean Sea area, the Baltic Sea area, the Black Sea area, the Red Sea area and the "Gulfs area" which are defined as follows:

- (a) The Mediterranean Sea area means the Mediterranean Sea proper including the gulfs and seas therein with the boundary between the Mediterranean and the Black Sea constituted by the 41°N parallel and bounded to the west by the Straits of Gibraltar at the meridian of 5°36'W.
- (b) The Baltic Sea area means the Baltic Sea proper with the Gulf of Bothnia and the Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57°44.8'N.
- (c) The Black Sea area means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41°N.
- (d) The Red Sea area means the Red Sea proper including the Gulfs of Suez and Aqaba bounded at the south by the rhumb line between Ras si Ane (12°8.5'N, 43°19.6'E) and Husn Murad (12°40.4'N, 43°30.2'E).
- (e) The "Gulfs area" means the sea area located north west of the rhumb line between Ras al Hadd (22°30'N, 59°48'E) and Ras al FasteH (25°04'N, 61°25'E).

(2) Subject to the provisions of Regulation 6 of this Annex:

- (a) disposal into the sea of the following is prohibited:
 - (i) all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags; and
 - (ii) all other garbage, including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials;
- (b) disposal into the sea of food wastes shall be made as far as practicable from land, but in any case not less than 12 nautical miles from the nearest land.

(3) When the garbage is mixed with other discharges having different disposal or discharge requirements the more stringent requirements shall apply.

(4) Reception facilities within special areas:

- (a) The Government of each Party to the Convention, the coastline of which borders a special area undertakes to ensure that as soon as possible in all ports within a special area, adequate reception facilities are provided in accordance with Regulation 7 of this Annex, taking into account the special needs of ships operating in these areas.
- (b) The Government of each Party concerned shall notify the Organization of the measures taken pursuant to sub-paragraph (a) of this Regulation. Upon receipt of sufficient notifications the Organization shall establish a date from which the requirements of this Regulation in respect of the area in question shall take effect. The Organization shall notify all Parties of the date so established no less than twelve months in advance of that date.
- (c) After the date so established, ships calling also at ports in these special areas where such facilities are not yet available, shall fully comply with the requirements of this Regulation.

Regulation 6

Exceptions

Regulations 3, 4 and 5 of this Annex shall not apply to:

- (a) the disposal of garbage from a ship necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or
- (b) the escape of garbage resulting from damage to a ship or its equipment provided all reasonable precautions have been taken before and after the occurrence of the damage, for the purpose of preventing or minimizing the escape; or
- (c) the accidental loss of synthetic fishing nets or synthetic material incidental to the repair of such nets, provided that all reasonable precautions have been taken to prevent such loss.

Regulation 7

Reception Facilities

- (1) The Government of each Party to the Convention undertakes to ensure the provision of facilities at ports and terminals for the reception of garbage, without causing undue delay to ships, and according to the needs of the ships using them.
- (2) The Government of each Party shall notify the Organization for transmission to the Parties concerned of all cases where the facilities provided under this Regulation are alleged to be inadequate.

APPENDIX B

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 (m³):
Food waste
Cargo-associated waste
Maintenance waste
Other
 - b. Amount not accepted by the facility (m³):
Food waste
Cargo-associated waste
Maintenance waste
Other
3. Special problems encountered:
Undue delay
Inconvenient locality of facilities
Unreasonable charges for use of facilities
Use of facility not technically possible
Special national regulations
Other
4. Remarks: For example, information received from port authorities
or operators of reception facilities, reasons for
nonacceptance (2.b 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