

Manual on Chemical Pollution

Section 2: Search and Recovery of Packaged Goods Lost at Sea

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Preface

The *Manual on Chemical Pollution* currently has two sections. Section 1, *Problem Assessment and Response Arrangements*, was first published in 1987 and revised in 1999. The present publication, Section 2, was prepared by the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO), and provides guidance to Governments on search and recovery procedures for packaged goods lost at sea to which the provisions of chapter VII of SOLAS 1974, as amended, and Annex III of MARPOL, as amended, apply.

Priority should be given to all measures that can reasonably be taken to avoid the loss overboard of packages containing dangerous goods and harmful substances. However, the possibility of such loss can never be totally excluded. *Search and Recovery of Packaged Goods Lost at Sea* describes the fate of such packages and related options for response, and gives guidelines on how to decide whether the packages should be recovered.

Problems related to oil pollution casualties and related information are specifically addressed in the *IMO Manual on Oil Pollution*, Sections I to VI.

Expert advice on response to lost packages containing IMDG Code Class 7 (Radioactive material) should be obtained from the International Atomic Energy Agency (IAEA) and reference made to the IAEA Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Materials Safety Guide TS-G-1.2.

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Chapter 1

Introduction

Section 1 of this Manual, *Problem Assessment and Response Arrangements*, was first issued in 1987 and revised in 1999. It provides guidance to Governments on ways of assessing hazards associated with spills of harmful substances other than oil and of setting up response organizations. It also describes safe operational practice in spillage response and appropriate training.

Section 2, *Search and Recovery of Packaged Goods Lost at Sea*, should be read in conjunction with Section 1. Its aim is to assist Governments in making decisions on search and recovery so that an appropriate and safe response can be made which minimizes damage to the environment and hazard to human health.

Chapter 2 of this Section provides information on the principal IMO Conventions that relate to the carriage of dangerous goods as packaged goods. The major portion of the chapter describes the *International Maritime Dangerous Goods Code* (IMDG Code), together with the *Emergency Response Procedures for Ships Carrying Dangerous Goods* (EmS Guide) and the *Medical First Aid Guide for Use in Accidents Involving Dangerous Goods* (MFAG). It also contains a description of incident reporting systems.

Chapter 3 describes the ways in which packaged goods may be lost at sea, their subsequent fate and the notifications and warnings that should be made.

Chapter 4 deals with locating packaged goods that have been lost at sea. The techniques and approaches that are required depends on the location of the lost packages, i.e., on the sea surface or on the sea-bed.

Chapter 5 deals with the identification of lost packaged goods that have been located and the means for assessing the hazards presented by them.

Chapter 6 deals with the actions that need to be taken for the recovery of packaged goods. These include conducting a risk assessment for the recovery operation, alternative methods of package recovery depending on the location of the packages and alternatives to recovery.

Chapter 7 addresses the particular types and hazards associated with hazard class 1 explosives, under the IMDG Code, and the particular considerations associated with their accidental recovery and response to the reporting of their loss.

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## **Chapter 2**

### ***Summary of regulations and arrangements relating to the carriage of dangerous goods in packaged form***

#### **2.1 Principal IMO Conventions**

Several IMO Conventions refer to the carriage of dangerous goods in packaged form.

##### ***2.1.1 International Convention for the Safety of Life at Sea (SOLAS 1974), as amended***

Regulation 3 of part A of chapter VII of the International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974), as amended, requires that the carriage of dangerous goods in packaged form by sea shall be in compliance with the relevant provisions of the International Maritime Dangerous Goods Code (IMDG Code).

##### ***2.1.2 MARPOL Annex III***

Some cargoes, if accidentally lost at sea, could cause environmental pollution to such a degree that action may need to be taken to avoid such an occurrence or to minimize the consequences thereof. MARPOL Annex III contains regulations for the prevention of pollution by harmful substances carried by sea in packaged form. These regulations lay down general principles of packing, marking, labelling, documentation, stowage and pollution criteria for the transport of environmentally harmful substances (marine pollutants). The regulations identify marine pollutants so that they could be packed and stowed on board ship in such a way as to minimize accidental pollution, as well as to aid identification, by using clear marks to distinguish them from other, less harmful, cargoes.

##### ***2.1.3 Hazardous and Noxious Substances (HNS) Convention 1996***

The HNS Convention, which is not yet in force, applies to claims, other than claims arising out of any contract for the carriage of goods and passengers, for damage arising out of the carriage of hazardous and noxious substances by sea. The scope of potential damage, the materials involved, the liability of

various parties and the arrangements regarding the compensation fund and contributing cargoes are described.

### 2.1.4 **OPRC–HNS Protocol (2000)**

The HNS Protocol 2000 to the OPRC Convention of 1990 applies to preparedness, response and co-operation to marine pollution incidents involving hazardous and noxious substances. It provides a framework for preparedness and response at national and regional levels and a platform for co-operation amongst Member States for marine pollution incidents involving hazardous and noxious substances, which may pose a threat to the marine environment or to the coastline or related interests of one or more States.

## 2.2 **International Maritime Dangerous Goods Code (IMDG Code)**

Recommendation 56 adopted by the International Conference on Safety of Life at Sea, 1960, invited the Organization to undertake a study with a view to establishing a unified international code for the carriage of dangerous goods by sea. The IMDG Code was first introduced in 1965 and it has been progressively modified in step with scientific and technological developments. It contains regulations for dangerous goods and marine pollutants and applies to all ships, including ships of less than 500 gross tons, carrying dangerous goods in packaged form.

### 2.2.1 **Classification**

Dangerous goods are divided in the IMDG Code into the following United Nations (UN) hazard classes:

#### **Class 1 – Explosives**

- Division 1.1 Substances and articles which have a mass explosion hazard
- Division 1.2 Substances and articles which have a projection hazard but not a mass explosion hazard
- Division 1.3 Substances and articles which have a fire hazard and either a minor blast hazard or both but not a mass explosion hazard
- Division 1.4 Substances and articles which present no significant hazard
- Division 1.5 Very insensitive substances which have a mass explosion hazard
- Division 1.6 Extremely insensitive articles which do not have a mass explosion hazard

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**Class 2 – Gases**

- Class 2.1 Flammable gases
- Class 2.2 Non-flammable, non-toxic gases
- Class 2.3 Toxic gases

**Class 3 – Flammable liquids**

**Class 4 – Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases**

- Class 4.1 Flammable solids, self-reactive substances and desensitized explosives
- Class 4.2 Substances liable to spontaneous combustion
- Class 4.3 Substances which, in contact with water, emit flammable gases

**Class 5 – Oxidizing substances and organic peroxides**

- Class 5.1 Oxidizing substances
- Class 5.2 Organic peroxides

**Class 6 – Toxic and infectious substances**

- Class 6.1 Toxic substances
- Class 6.2 Infectious substances

**Class 7 – Radioactive material**

**Class 8 – Corrosive substances**

**Class 9 – Miscellaneous dangerous substances and articles**

Each of these classes has a distinctive label (see annex) and other information referring to individual substances and the hazards that they may present.

The IMDG Code also contains provisions which deal with the packing, identification, marking, labelling and placarding of dangerous goods, the documents which are to be provided, stowage and segregation requirements and the carriage of explosives on board passenger ships.

All substances, materials and articles which appear in the Dangerous Goods List of the IMDG Code are also listed, in alphabetical order, in the index of the Code, which gives the product's hazard class and UN number. Substances identified as marine pollutants are indicated as such in the index.

Although designed primarily for mariners, the provisions of the IMDG Code provide guidance to chemical manufacturers, exporters, shippers and handlers and transport services from manufacturer to user.

It should be noted that the classification and labelling of substances transported in packaging or as packages are generally subject to two types

of regulations. One set of regulations will govern their transport, i.e., the IMDG Code, while the other will be the occupational health and safety regulations governing their usage at the national and/or regional level, such as within the European Union, for example.

A substance may be classified as requiring a hazard label for use, but not for transport, and vice versa. Port authorities also consult the IMDG Code for guidance on segregating dangerous substances in loading, discharge and storage areas.

### 2.2.2 **Packaging**

Chapter 4.1 of the IMDG Code contains information on the use of packaging, including intermediate bulk containers (IBCs) and large packaging and chapter 6.1 of the IMDG Code contains provisions on the construction and testing of packaging. For packing purposes, substances other than those covered by classes 1 (explosives), 2 (gases), 5.2 (organic peroxides), 6.2 (infectious substances) and 7 (radioactive material) and other self-reactive substances of class 4.1 are assigned to three packaging groups according to the degree of danger they present, i.e:

- Packing Group I: substances presenting high danger
- Packing Group II: substances presenting medium danger
- Packing Group III: substances presenting low danger

The packing group to which a substance is assigned is indicated in the Dangerous Goods List in chapter 3.2 of the IMDG Code and has an impact on the detailed requirements for the construction of and performance testing on types of standard packaging and packages ready for shipment.

### 2.2.3 **Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide)**

No matter how closely regulations are followed, there is always the danger that an incident may lead to an emergency. In response to a request that advice on emergency response procedures be made available to those concerned with the carriage of dangerous goods, the Organization developed group emergency schedules for all substances, materials and articles covered by the IMDG Code. These appear in the *Emergency Response Procedures for Ships Carrying Dangerous Goods* (EmS Guide), which is found in the supplement to the IMDG Code. The group emergency schedules contain guidance to be followed in case of incidents involving dangerous goods to protect the ship as well as those on board.

The introductory part of the publication gives general advice on dealing with emergencies. More specific advice is given in the emergency schedules which divide the various substances, materials and articles contained in each hazard class into groups and provide advice on any special emergency

equipment that should be carried. They also include emergency response procedures and actions to be taken in case of spillage or fire. The remedial action may vary depending on whether the goods are stowed on deck or under deck and the emergency schedules include supplementary advice where necessary.

The EmS Guide index refers to two types of emergency schedules. The first set of emergency schedules is for *fire*, while the second set addresses *spillage*. Underlined EmS codes (special cases), as reflected in the Dangerous Goods List of the IMDG Code, indicate a substance, material or article for which additional advice is given in the emergency response procedures. For dangerous goods offered for transport as N.O.S. (not otherwise specified) entries or other generic entries, the most relevant emergency response procedures may vary with the properties of the hazardous constituents. As a consequence, shippers may be required to declare different emergency schedules from those indicated if, to their knowledge, such codes are more appropriate.

#### **2.2.4 Medical First Aid Guide for use in Accidents Involving Dangerous Goods (MFAG)**

This Guide gives information on how injuries, which may arise from accidents involving dangerous goods, should be dealt with. It is intended to provide the advice necessary if chemical poisoning has been diagnosed and is to be treated within the limits of the facilities available on board ships.

The advice given in the MFAG refers to the chemicals, substances and other dangerous goods covered by the IMDG Code and other codes. It should therefore be used in conjunction with the information provided in the IMDG Code and the EmS Guide.

Within the MFAG, chemicals are grouped into tables according to their chemical properties. There may be various degrees of toxicity within a group. In the rare circumstances where a chemical cannot be classified in an appropriate table according to its chemical properties, it has been assigned to a table, which is consistent with the toxic medical effects to be expected from poisoning by that chemical. The tables themselves give general information about the particular group of chemicals in question and indicate the toxic effects likely to be encountered.

#### **2.2.5 Marine pollutants**

The IMDG Code covers the marine pollution requirements of Annex III of MARPOL. Substances, materials and articles with marine pollution hazards are identified as such in the Dangerous Goods List and in the index of the Code. Packages containing marine pollutants should be marked with the appropriate Marine Pollutant mark.

## **2.3 Further information on the transport of dangerous goods by sea**

### **2.3.1 *IAEA Regulations for the Safe Transport of Radioactive Materials (TS-R-1)***

The International Atomic Energy Agency regulations establish standards of safe packaging which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment.

### **2.3.2 *IAEA Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material Safety Guide (TS-G-1.2)***

Compliance with the transport regulations for radioactive material provides a high level of safety during transport. Historically, there have been no reported transport accidents involving radioactive materials that have resulted in serious radiological consequences. However, when a transport accident involving radioactive material occurs, and although many will pose no radiation safety problem, emergency response actions are needed to ensure that radiation safety is maintained.

The type of emergency planning and preparedness for responding to transport accidents involving radioactive material is, to some extent, similar to that required for responding to transport accidents involving other types of dangerous goods, such as flammables, explosives, poisonous gases, corrosives and toxic chemicals that are transported on a daily basis.

The objective of this Safety Guide is to provide guidance to public authorities and others (including consignors, carriers and emergency response authorities) who are responsible for developing and establishing emergency arrangements for dealing effectively and safely with transport accidents involving radioactive material.

## **2.4 Reporting of movement of packaged dangerous goods**

### **2.4.1 *Advance notification of the movement of certain dangerous goods***

Most regulatory authorities will have established a system whereby the port authority is to be notified of the arrival of certain dangerous substances in good time, generally not less than 24 hours in advance, and will have issued rules or regulations on the various types and minimum quantities of dangerous goods for which prior notification of transport is required. Details of information which should be notified are given in appendix 1 of

the *Recommendations on the Safe Transport, Handling and Storage of Dangerous Substances in Port Areas* (revised edition, 2007).

For certain dangerous goods, it is a requirement that approval for transport and information on the conditions of transport is obtained from the competent authority concerned before a shipment may take place. In some cases, this may involve the competent authorities in the country of origin and the country of final destination, and sometimes even the competent authorities of the countries *en route*.

For some dangerous goods, such as radioactive materials and infectious substances, notification procedures are laid down in the introduction to their respective classes in the IMDG Code.

## **2.4.2 Information provided to the master regarding the cargo**

It is essential that those involved in the handling and transport of dangerous goods are advised beforehand as to the characteristics and hazardous properties of the goods and of any necessary safety precautions to be observed. They should also be provided with information on safety and marine pollution hazards, first-aid treatment and emergency response procedures to be followed and action to be taken in case of an incident. Reference is made to the requirement of regulation 4, chapter VII, of SOLAS 1974, as amended, and of regulation 4, Annex III of MARPOL, related to documentation, as well as to the detailed provisions contained in the IMDG Code.

The responsible officers and crew of a ship carrying packaged dangerous goods should be trained on the general hazards involved and should be aware of the necessary precautions to be observed.

## **2.4.3 Information provided to port State authority**

In the case of an incident resulting or likely to result in marine pollution, the coastal State's action could be impeded or delayed if information on the cargo is not immediately available. Therefore a copy of one of the documents required under regulation 4, chapter VII of SOLAS 1974 and regulation 4, Annex III of MARPOL should be presented before departure to the person or organization designated by the port State authority.

## **2.5 Reporting loss of packages containing dangerous goods or marine pollutants**

### **2.5.1 Reporting systems**

The mandatory reporting requirements for incidents involving harmful substances are contained in article 8 and Protocol I of the 1973 MARPOL Convention. These provisions became effective for Contracting Parties on

2 October 1983, the date on which MARPOL entered into force. Protocol I was amended in 1985 and in 1996, with the new amendments entering into force in 1987 and 1998 respectively.

Protocol I requires that incidents involving the discharge or possible discharge of oil, noxious liquid substances carried in bulk, and harmful substances in packaged form ("Marine Pollutants") shall be reported by the fastest telecommunication channels available with the highest possible priority to the nearest coastal State.

The need for information on the loss or likely loss overboard of packaged dangerous goods at sea has long been recognized and the Maritime Safety Committee of the Organization recommends that the master of a ship or other responsible person should report such incidents, without delay, to the nearest coastal State.

There are various ship reporting systems and reporting requirements in addition to those for marine pollutants and dangerous goods. The information gathered through such systems and requirements provides data for many purposes, such as search and rescue, vessel traffic services, weather forecasting and prevention and control of marine pollution.

National ship reporting systems may use different procedures and formats, which could cause confusion to masters of ships moving from one area to another. In order to harmonize these systems, IMO has adopted resolution A.851(20), General principles for ship reporting systems and ship reporting requirements, including Guidelines for reporting incidents involving dangerous goods, harmful substances and marine pollutants, as amended by MEPC resolution 138(53).

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