1. CARRIAGE OF DANGEROUS GOODS

Scope:

Module 3: This Module addresses the competencies on the following:

Carriage of Dangerous Goods

Objectives:

Module 3: Upon completion of this module, the candidate shall be able to:

a) Refer to appropriate international regulations, codes and standards, codes and recommendations when carrying dangerous cargoes
b) Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

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The IMDG Code – Introduction

The IMDG Code is an international agreement for the transport of dangerous goods by sea, published by IMO. The Code was developed as a consequence of the implementation by IMO of Recommendation 56 of the 1960 International Conference on Safety of Life at Sea (SOLAS). This stated that governments should adopt unified procedures for the carriage for the carriage of dangerous goods by sea.

Legislation covers the classification, packaging, stowage (including permissible proximity and positioning) of Dangerous Goods during transport and storage.

The code is based on the report of the United Nations Committee of Experts on the Transport of Dangerous Goods, which also forms the basis for legislation and recommendations for transport of Dangerous Goods by other modes, e.g. ADR, RID, IATA (road, rail and air).

The IMDG Code consists of two volumes and supplementary documents.

Volume 1 deals with:

general provisions, definitions and training, classification, packing and tank prvosions, consignment procedures, construction and testing of packagings intermediate bulk containers (IBCs), large packagings, portable tanks and road tank vehicles, and provisions concerning transport operations.

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Volume 2 lists dangerous goods in tabulated form by United Nations Number (UN no.) with substances indexed against the UN number.
Appendices contain a list of generic and N.O.S. proper shipping names and glossary.

The supplementary documents contain information about emergency response procedures for ships carrying dangerous goods (the EmS guide).

Classification of IMDG Code

The IMDG Code recognises **nine** broad classes of dangerous goods. For the correct classification and labelling of dangerous goods reference should be made to the IMDG Code. The fact that a substance is not listed in the Code should not be taken as evidence that it is nondangerous.

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Class 1: Explosives

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

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Class 2: Gases

Gases may be explosive, flammable, poisonous or corrosive. Some gases may polymerise and must be stabilised and inhibited prior to shipment.

Class 2.1 — Flammable gases

Class 2.2 — Non-flammable, non-toxic gases

Class 2.3 — Toxic gases

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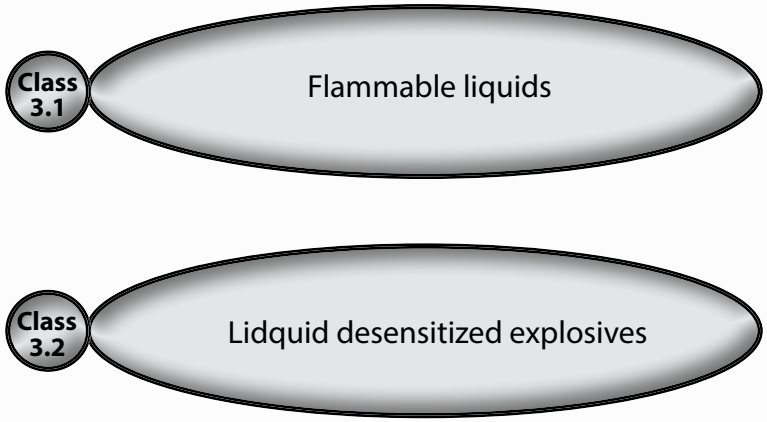
Class 3: Flammable liquids

The main danger associated with the carriage of these substances is the escape of flammable vapour which may also be toxic.



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Class 4: Flammable solids

Cargo in this class, where practical, should be monitored for any unexplained rise in temperature.

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.

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Class 5: Oxidizing substances and organic peroxides

This class includes substances that easily yield oxygen, and can support combustion without air supply. This can make the fire in other substances become severe. Substances in this group are probably among the most dangerous substances transported by ship.

Class 5.1 — Oxidizing substances

Class 5.2 — Organic peroxides

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Class 6: Toxic and infectious substances

Class 6.1 — Toxic substances

Class 6.2 — Infectious substances

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Class 7: Radioactive material

All radioactive materials are dangerous to a greater or a lesser because they emit invisible radiation, which may damage body tissue. This damage arises either from external irradiation or from internal irradiation following the intake of radioactive material into the body.

Class 7.1

State authorisation must be obtained for the shipment to proceed, e.g. Panama Canal Authority

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Class 8: Corrosive substances

The substances in this class are solids or liquids possessing in their original state, the common property of being able, more or less severely, to damage living tissue. The escape of such a substance from its packaging may also cause damage to other cargo or to the ship.

Class 8.1

Spillage of these substances may damage other cargo and be injorious to human health.

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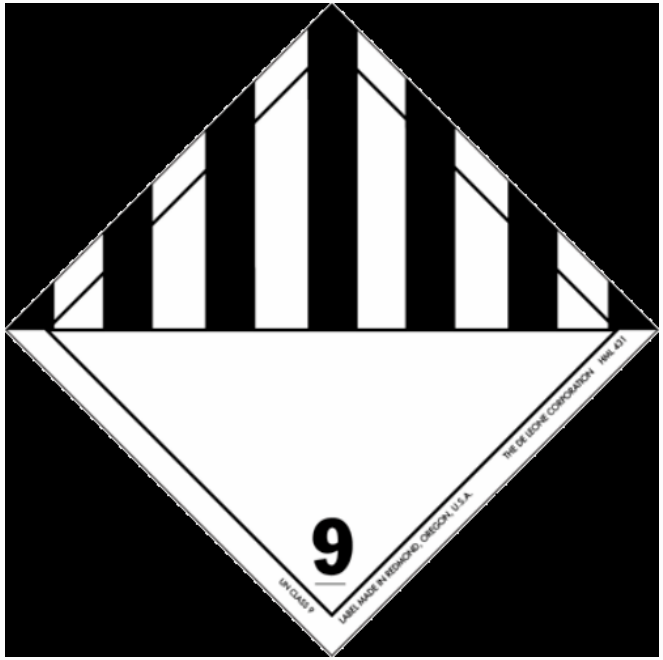
Class 9: Miscellaneous dangerous substances and articles

- Substances and articles not covered by other classes which experiences has shown, are such a dangerous character that the provisions of part A of Chapter VII of SOLAS 1974, as amended, should apply.
- Harmful substances not subject to the provisions of part A of chapter VII of the aforementioned Convention, but to which the provisions of Annex III of MARPOL 73/78, apply.



Class 9.1

These substances, although dangerous, have not been allocated to any particular class.

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Marine pollutant

Substances of all classes may be classified as marine pollutants; as such they are dangerous which also pollute the marine environment. A distinction is made between substances, which are marine pollutants and those, which are severe marine pollutants. Many of the commodities assigned to classes 1-9 are marine pollutants and where identified as such, should carry the marine pollutant mark on the packaging.

Packing

Introduction

The packing and tank provisions are a guide to mariners as well as to competent authorities, shippers of dangerous goods and marine pollutants, and to manufacturers how to pack goods for the transportation.
The strength of packaging should be such that it will retain it's content and keep them free from contamination under the normal conditions of carriage by sea.
If you look up a substance in the dangerous goods list in the IMDG Code other than Class 1, 2, 6.2 and 7, you will see that it contains information on which packing-group the product is placed in.
It is clear that the packing is of great significance for safe transportation. The packing shall resist the substance it contains endure heat and cold, be able to pile up without collapsing, and withstands knocks.
The regulation provides, inter alia, that the packaging of dangerous goods shall be capable of withstanding the ordinary risks of handling and carriage by sea.

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Packing groups

Dangerous goods of all classes other than classes 1, 2, 6.2 and 7 have, for packing purposes, been divided into three groups according to the degree of danger they present:

1. **PG I** - Great danger
2. **PG II** - Medium danger
3. **PG III** – Minor danger

Marking of packages

Since 1 January 1991, all packaging used for containment of dangerous goods must be tested and be provided with a marking. This is described in Part 6 (Volume 1). The marking should follow these rules - each packaging intended or use according to this code should bear markings which are durable, legible and placed in such a location and of such a size relative to the packaging as to be readily visible.

Packaging for classes **3, 4.1, 4.2, 4.3, 5.1, 6.1** and **8**

The IMDG code presents the packaging requirements in several different ways. Most of the dangerous goods classes have a packaging table in the class introduction and this table establishes the basis of packaging procedures for the class concerned.

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Packaging for classes **1, 2, 5.2, 6.2, 7** and **9**

Each of these classes has very particular packaging procedure, which is as follows:

- Class 1 (Explosives) - The packaging requirements for this class are those set down by the UN Recommendations and they are listed in chapter 4.1.5 in the Code (Part 4 – Volume 1).

- Class 2 (Gases) – There are currently no international standards for gas receptacles (cylinders) and the IMDG Code like the other modes provides that cylinders shipped by sea are the responsibility of the country of consignment. The vessel carrying the cylinders should ensure that they would be accepted at the destination port. These packing requirements are listed in chapter 4.1.6 in the Code (Part 4 – volume 1).

- Class 5.2 (Organic Peroxides) – packing is defined with objective of avoiding undue confinement in the event of fire and in turn limiting the explosive effects. These packing requirements are listed in chapter 4.1.7 in the Code (Part 4 – Volume 1)
The relevant schedule provides a list of approved organic peroxide (usually in a table) and one column lists the appropriate packing method.

- Class 6.2 (Infectious substances) – this class contains only three schedules and in each instance the Competent Authority must approve the package. These packing requirements are listed in chapter 4.1.8 in the Code (Part 4 – Volume 1)
In general an infectious substance will be carried in a test tube, vial or blood bag placed inside another packaging, which must contain sufficient absorbent material to absorb the entire content. These will be placed in an outer packing.

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- Class 7 (Radioactive Materials) – the design, testing, selection and use of packing systems for radioactive materials (RAM) follows a radically different procedure to that for packaging for other hazardous material.
The standard IMDG packaging controls are not employed for the selection of RAM shipments. These packing requirements are listed in chapter 4.1.7 in the Code (Part 4 – Volume 1)

- Class 9 (Miscellaneous dangerous Goods) - Because Class 9 contains a range of miscellaneous substances and articles the packaging requirements are shown on individual schedules. It is not a requirement that every substance in this class is carried in UN-tested packages.

Intermediate bulk container (IBC)

The IBC is a packing method that falls between the carriage of a substance in bulk and in normal packaging. The purpose is to gain efficiency in handling but to retain maneuverability for the user. An IBC can be rigid or flexible, made of any material such as paper, metal, wood or plastics. It can have a variety of opening arrangements and can be used to carry liquids or solids.
In general an IBC can have a capacity of not more than 3 cubic meters or 3000 liters. An IBC must be suitable for handling by mechanical means and is obligated to bear markings in a similar manner to other packaging.

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Portable tanks

Portable tanks are defined as a tank having a capacity of more than 450 liters and which is fitted with its own service equipment and is suitable for the transport of substances with a vapor pressure not greater than 3 bar at temperature of 50 degree Celsius.

There are seven types of tanks which are separated into three groups:

1. Dangerous substances other than Class 2
2. Non refrigerated liquefied gases of Class 2
3. Refrigerated gases of Class 2

1. Dangerous substances other than class 2

Tanks for the carriage of dangerous substances other than Class 2 contain three types of portable tanks:

Type 1 – has a maximum allowable working pressure of more than 1.75 bar.
Type 2 - has a maximum working pressure of less than 1.75 bar but 1.0 bar or above.
Type 4 – A road tanks vehicle used on short international voyages only.

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2. Non refrigerated liquified gases of class 2
Tanks for the carriage of non-refrigerated liquefied gases of Class 2 contain two types of portable tanks:

Type 5
Type 6 - a road tank vehicle used on short international voyages only.

3. Refrigerated gases of class 2
Tanks for the carriage of refrigerated gases of Class 2 contain two types of portable tanks:

Type 7
Type 8 – a road vehicle used on short international voyages only.

Packing performance test

As an example a plastic Jerrican will be used, which is mostly related for packing of corrosive substances. This Jerrican must go through the following test:

1. Drop Test – all packages
2. Leakproofness Test – only single packaging for liquids
3. Internal pressure (hydraulic) test – only single packaging for liquids
4. Stacking Test – not bags

In addition, there is also a Cooperage test, which is an additional test for wooden barrels.

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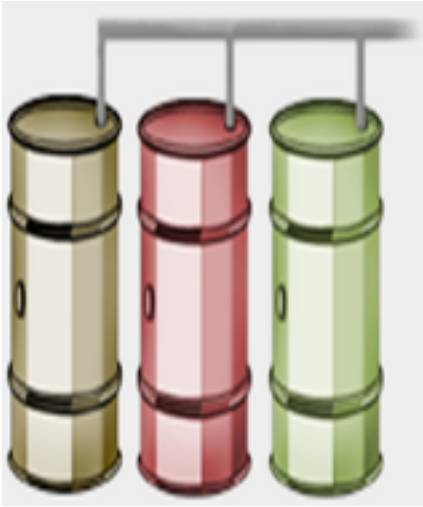
Leakproofness test – only single packaging for liquids

The leakproofness test should be performed on all designs types of packaging intended to contain liquids; however, this test is not required for the inner packaging of combination packaging.

I.e.: The Jerrican, should be restrained under water for 5 minutes while an internal air pressure is applied. The method of re-straint should not affect the results of the test. The air pressure (gauge) to be applied should be: 30 kPa (0.3 bar) – 20 kPa (0.2 bar) dependent on package group.



Internal pressure (hydraulic) test – only single packaging for liquids

Packaging to be tested: the internal pressure (hydraulic) test should be carried out on all design types of metal, plastics and composite packaging intended to contain liquids. This test is not required for inner packaging of combination packaging.

Example: three barrels should be subjected to the test pressure for 5 minutes. This pressure is the one to be included in the marking required. The test pressure should be applied continuously and evenly; it should be kept constant throughout the test.

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Stacking test

All desing types of packaging other than bags should be subjected to a stacking test.

Example: three barrels shall be subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical packages, which might be stacked on it during transport. The minimum height of the stack including the test sample should be 3 meters. The duration of the test should be for a period of 28 days at a temperature of minimum 40°C.

Consignment procedures identification

When dangerous goods are being transported by ship, the consignee shall make sure that the goods are identified in all shipment documents with the correct technical name and corresponding UN number stated in the code. The trade name can be stated in addition to the technical name.
It is essential that dangerous can be identified as such, in order to allow those involved, to take the necessary care and precautions. This ready identification is particularly important in the case of an incident involving these goods, in order to determine what emergency procedures are necessary to deal properly with the situation and in the case of marine pollutants, for the master to comply with the reporting requirements.

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Proper shipping name

To endure accurate identification, all dangerous goods must be identified by the use of their proper shipping name. This is neither a trade name nor an abbreviated from the name.

Example: The package shouldn't contain the trade name "Duracell", but proper shipping name should be used: Lithium ion batteries , UN no. 3480.

United Nations number

All dangerous goods are assigned a United Nations number referred to as the UN no.

The UN no. is made up of four digits. There is no meaning to the number as the UN no. is issued sequentially as substances are added in Chapter 2 of the Orange book.

Mixing of substances

Mixing of different substances shall be declared by the most dangerous component name. As an example, wood preservation liquid is both inflammable and toxic. The most dangerous component is in this case the inflammable liquid, and the substance is declared as Class 3.

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Labelling

All dangerous goods' packages offered for shipment must be correctly labelled (or stencilled) with the appropriate dangerous goods labels and show the proper shipping name and UN no. as used in the shipping documents.

Four dangerous goods' class labels (placards) should be affixed to the container, one on each side and one on each end including one on the right hand door. The label on each side should be positioned so as to be clear of the container doors when opened and secured back.
The label on the front end of the container should be positioned so as to be clear of the towing vehicle if possible. The dangerous goods' label affixed to the right hand door should be fully completed with the technical name(s) of the substances in the container together with the UN no. and number of packages as well as any other information considered useful. The label should be completed using a waterproof medium, e.g. a spirit pen.

Hazard labels

Each package containing a dangerous substances shall be explicitly marked, by the shipper (consignor) before it is transported. Labels are provided which denote the hazard by means of colors and symbols

The class number should appear in the bottom corner of the labels, except that, in the case of labels for class 5, it is the sub-class number, i.e. 5.1 or 5.2, which should appear.

The text on the labels for class 7 should always appear. If text is used, the text shown is recommended for the purpose of uniformity.

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Placard

A placard should:
– Be not less than 250 mm x 250 mm
– Correspond to the label for the class of the dangerous goods in the cargo transport unit with respect to color and symbol
– Display the number of the class, as appropriate, in the lower half, as required for the label, in digits not less than 25 mm high.

Marine pollutant mark

A special marine pollutant mark has been developed. This mark should be in contrasting color to the packaging, or when used as a sticker, colored black and white.

For packages, the triangular mark should have sides of at least 100 mm except in the case of packages, which because of their size can only bear smaller marks. For cargo transport units this dimension should not less than 250 mm.

Elevated temperature mark

As this mark is only required where the transport temperature is at or over 100 degrees Celsius for liquids or 240 degrees Celsius for solids, this mark will only appear on a thermal tank or special unit.

This mark shall be triangular with sides of at least 250 mm and should be shown in red.

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Fumigation warning mark

The details are to be filled in on the sign, while the sign should be placed on the door of the unit.

The sign should be rectangular and should not be less than 300 mm wide and 250 mm high. The markings should be black print on a white background with lettering not less than 25 mm high.

Subsidiary risks

Many goods have additional dangerous properties. Where necessary this is indicated by requiring subsidiary risk labels.

The labels for the subsidiary risk will be identical to the labels for the primary risk except for Class 1 Explosives. When Class 1 is the subsidiary risk the class number division will be shown, but the division number will not be shown.

Example:

A liquid can be both inflammable (class 3), and toxic (class 6) and corrosive (class 8), and all three warning signs shall be used.

HYDRAZINE, ANHYDROUS, UN no. 2029; Packaging group: I; Label of Class 8; Subsidiary risk label of classes 3 and 6.1
Properties: Colorless, flammable liquid with ammonia odor.
Flashpoint:52°C c.c.
Highly reactive reducing agent.
Ignites spontaneously when in contact with porous materials such as earth, wood or cloth.

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Empty packages and units

When the dangerous goods have been removed from a package or unit and the residues have been cleaned up, the labels or placards should be removed or masked. Until this has occurred, the package or unit is to be considered to be dangerous and treated in the same manner as if it still contained the dangerous goods.

Packaging

Packages of all types should be properly closed with lids, bungs and other closures in place and tight. Although it is impossible to see the inner receptacle of the package, it should be ascertained that the outer one has not been damaged and that none of the absorbent packaging (if used) is missing. Any strong smells indicating a possible leakage should be carefully investigated and if the cause is not readily found, further advice should be sought. Stains on a package, particularly of recent origin should be investigated.

Dented drums, particularly if dented near the joints, rolling bands or spigots, should be carefully examined. If the dent occurs while packing the container or loading aboard the ship, the drum concerned should be set aside and loaded last, after careful examination to ascertain that no damage has been caused.

Wooden barrels (hogsheads, casks, etc.) are particularly susceptible to damage and should be carefully examined to see that the heads have not sprung. If stowed on end, the bung should be particularly well examined. Damaged plywood, fibreboard cartons with plastic interiors, multiwall paper bags and sacks used for crystals and powder, with the attendant risk of leaking contents should not be loaded.
Cylinders and tanks of inflammable and/or poisonous gases should have the protective hoods for valves properly fitted. Any showing signs of damage should be refused for shipment.

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Documentation

Each ship carrying dangerous goods or marine pollutants should have a special list or manifest providing full details of the goods being carried and their location on the ship.
This list or manifest should be based on the Dangerous Goods Notes (DGN) and certificates/declarations required by the Code and should include details of stowage locations.
Appropriate emergency response information must be available at all times for use in the event of an accident involving dangerous goods.

Transport operations

In order to ensure that the safe transport and handling is maintained throughout the journey and in particular, that appropriate action may be taken in the event if an emergency, it is essential that everyone involved in the movement of dangerous goods should be aware of the dangers that they present.
When dangerous goods are offered for transport by sea they must therefore be properly marked, labeled and placarded, and accurately described and certified on a transport document. If the package is capable of surviving three months immersion in the sea, the method of applying all the marks, labels, placards and other signs must be such that they also survive in this period.

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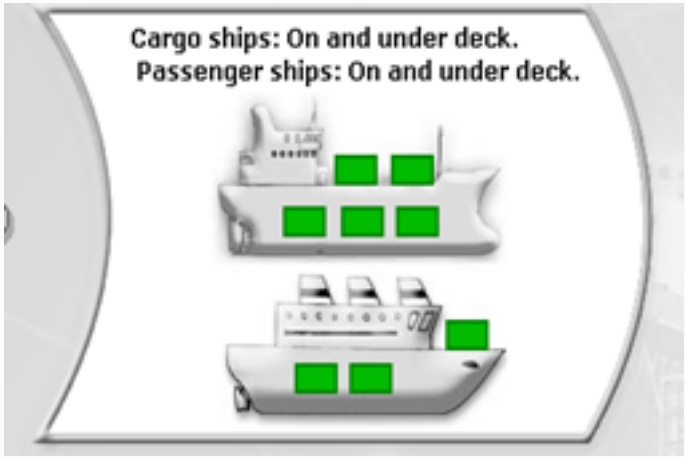
Stowage categories

Except for Class 1 – Explosives, ships have been considered under two groupings for the purpose of making appropriate stowage recommendations:

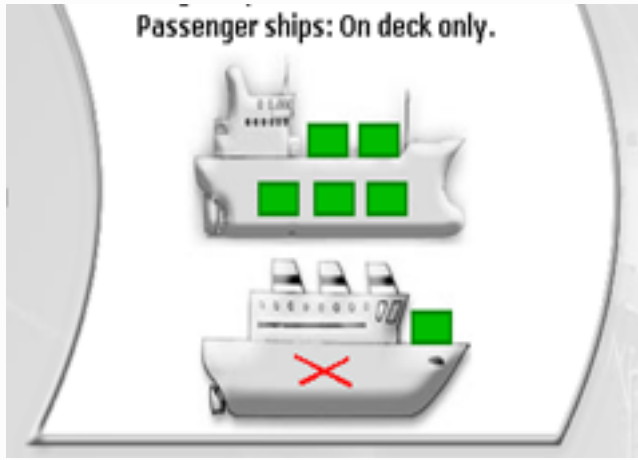
1. Cargo ships or passenger ships carrying a number of passengers limited to not more than 25 or to 1 passenger per 3 meters of overall length, whichever is the greatest.

2. other passenger ships in which the limiting number of passengers transported is exceeded

Type A



Type B



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Type C

Type D

Type E

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General stowage requirements

Stowage on deck

Stowage on deck only has been prescribed in cases where:

- Constant supervision is required
- Accessibility is particularly required
- There is substantial risk of formation of explosive gas mixtures, development or unobserved corrosion of the ship.

Walkways and access

On and under deck: Ensure all walkways and access ways are clear.
On deck: Ensure all hydrants, sounding pipes and working fittings are clear and accessible.

Shaded from radiant heat

Some substance need to be protected from radiant heat and large temperature variations.

This includes:

- Protection from strong sunlight (not on the top or at the side of an on-deck stow)
- Stow "away from" sources of heat such as heating coils, steam pipes, machinery bulkheads and the like.

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Stowage clear of living quarters

The purpose of stowage "away from" living quarters is to prevent the leakage of vapors into the accommodation and work spaces.

Therefore, stow well clear of doors, ports, vents and air intakes leading to those spaces.

Stowage of marine pollutants

Marine pollutants are substances, which harm the environment and therefore every endeavor should be made to prevent them being lost overboard or leaking into the sea.

Therefore:
- "Under deck" stowage is to be preferred where permitted
- "On deck" stowage should be in a sheltered area, i.e. do not use outboard or end position of stow.

Stowage of drums

Drums containing dangerous goods are to be stowed upright unless otherwise permitted by the competent authority.

This applies to drums in open stow as well as to drums packed into a cargo transport unit.

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Foodstuffs and classes **2.3, 6.1, 6.2, 7** and **8**

Poisonous gases of Class 2.3 and all toxic substances of Class 6.1, packing groups I and II, are to be stowed separated from foodstuff. However, no segregation is required when the foodstuffs and these dangerous goods are carried in separate closed containers.

Class 6.1, packaging group III, are to be stowed "away from" foodstuffs. All infectious substances, class 6.2, are to be stowed "separated by a complete compartment from" all foodstuffs.

All substances requiring Class 7 label, radioactive materials, are to be stowed separated from foodstuffs.

All substances, which require a cass 8 label, corrosives are to be stowed away from food stuff.

Water damages

Packages susceptible to water damage where possible are to be stowed "ender deck".
If stowed "on deck" they must be protected from the weather and seawater.

Condensation (sweat) within containers or units may also be critical. In this case containers should be protected from variations in temperature where possible.

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Segregation

When dangerous goods are on board a ship, there may be a risk of leakage or an accident or incident during the voyage.

Considerations need to be given to the possible reaction between different dangerous goods.

Dangerous goods need to be separated from each other on the ship if reaction is possible which is referred to as segregation.

General principles for segregation

Whenever two dangerous goods are stowed together, the segregation between the dangerous goods from others should always be in accordance with the most stringent requirements of any of the dangerous goods involved

When subsidiary risk labels are used then the segregation required is the most stringent of the two – the primary or the subsidiary risk.

The terms, compartment and hold, mean cargo spaces totally enclosed by steel, bulkheads, plating and decks. These boundaries are to be resistant to fire and liquid.

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Four categories of segregation

There are four categories of segregation:

1. Away from – this means separated by distance of 3 meters or by a steel or bulkhead

2. Separated from – this means in separate holds or, where a deck is resistant to fire and liquid, in separate compartments in a hold. For "on deck" stowage, this is interpreted to mean a distance of 6 meters horizontally.

3. Separated by complete compartment from - this means that the good must be separated by a complete hold. However, if there are decks, which are resistant to fire and liquid, the separation can be separated by a complete compartment. If one package is under deck but in the upper compartment and the other on deck, 12 meters segregation is applied.

4. Separated longitudinally by an intervening complete compartment or hold from - This is similar to the previous criteria except that the separation by a deck is not permitted and so these dangerous goods cannot be stowed in the same vertical line as each other. For "on deck" stowage, the distance is increased to 24 meters including from a package under deck.

Legend

Segregation table

The following table shows the general requirements for segregation between the various classes of dangerous goods.

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Class	1.1 1.2 1.5	1.6	1.4	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
1.1, 1.2, 1.5	*	*	*	4	2	2	4	4	4	4	4	4	2	4	2	4	x
1.3, 1.6	*	*	*	4	2	2	4	3	3	4	4	4	2	4	2	2	x
1.4	*	*	*	2	1	1	2	2	2	2	2	2	x	4	2	2	x
2.1	4	4	2	x	x	x	2	1	2	x	2	2	x	4	2	1	x
2.2	2	2	1	x	x	x	1	x	1	x	x	1	x	2	1	x	x
2.3	2	2	1	x	x	x	2	x	2	x	x	2	x	2	1	x	x
3	4	4	2	2	1	2	x	x	2	1	2	2	x	3	2	x	x
4.1	4	3	2	1	x	x	x	x	1	x	1	2	x	3	2	1	x
4.2	4	3	2	2	1	2	2	1	x	1	2	2	1	3	1	1	x
4.3	4	4	2	x	x	x	1	x	1	x	2	2	x	2	2	1	x
5.1	4	4	2	2	x	x	2	1	2	2	x	2	1	2	1	2	x
5.2	4	4	2	2	1	2	2	2	2	2	2	x	1	3	2	2	x
6.1	2	2	x	x	x	x	x	x	1	x	1	1	x	1	x	x	x
6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	x	3	3	x
7	2	2	2	2	1	1	2	2	2	2	1	2	x	3	x	2	x
8	4	2	2	1	x	x	x	1	1	1	2	2	x	3	2	x	x
9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Numbers and symbols relate to the following terns as defined in this section:

1 - "Away from" 2 - "Separated from" 3 - "Separated by a complete compartment or hold from" 4 - "Separated lingitudinally by an intervening complete compartment or hold from" x - The segregation, if any, is shown in the individual schedules * - * - CHECK, as I do not know what to put here	1.1, 1.2, 1.5 - Explosives 1.3, 1.6 - Explosives 1.4 - Explosives 2.1 - Flammable gasses 2.2 - Non-toxic, non-flammable gasses 2.3 - Toxic gasses 3 - Flammable liqids 4.1 - Flammable solids (including self-reactive and related substances and desensitise explosives) 4.2 - Spontaneously combustible substances 4.3 - Substances which are dangerous when wet 5.1 - Oxidising substances (agents) 5.2 - Organic peroxides 6.2 - Infectious substances 7 - Radioactive materials 8 - Corrosives 9 - Miscellaneous dangerous substances and articles

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Use of segregation table

The class numbers are given across the top of the table, as well as down the left hand column. To extract the segregation requirement between two classes of dangerous goods: enter the table with class of one dangerous goods from the left hand side, follow the row across the column which corresponds to the other class entered at the head of the table.

The use of the table gives the segregation requirement of 1, 2, 3, 4, x or *. These references are defined below the table. Caution should be exercised in the use of the table as information is generalized.

Therefore reference must always be made to the individual schedule as described in Step 1.

X does **not** mean that no segregation is required – always check the individual schedule.

Since the properties of substances or articles within each class may vary greatly, the individual schedules should always be consulted. For particular requirements for segregation as, in the case of conflicting requirements, these take precedence over the general requirements. Segregation should also take account of a single subsidiary risk label.

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Container traffic

The term container covers freight containers used for transport of packaged dangerous goods, bulk packing used for solid dangerous goods, or portable tanks used for solids, liquids or gases.

Dangerous goods, which require segregation from each other must not be carried in the same freight container.

The only exception is when the least stringent segregation level "away from" is specified, and then the goods can be carried together with prior approval of the competent authority

Terms:

Closed Container – is a container fitted w/ permanent structures which totally enclose the contents.

Open Container – all containers which do not meet the definition of being closed.

Container Space - means a distance not less than 6 meters (20 feet) fore and aft or not less than 2.4 meters (8 feet) athwart ship.

Cellular Ship – a ship which containers are loaded under deck into specially designed slots giving a permanent stowage of the container during sea transport. Containers loaded on deck in such ship are specially stacked and secured on fittings.

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Container's placards and marking 250 x 20 ?!

Should be marked with 4 placards, dimensions of 250 mm x 20 mm placed on the sides and in the doors. Name of dangerous goods should also be written on the container.

Remember to remove all placards and marking when the container is empty.

Stowage of containers on container vessels

Containers are segregated as other dangerous goods, but they have special segregation regulations.

Two types of container segregation:

- Vertical segregation

- Hozirontal segregation

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Roll on/roll off ships

There are some alternatives and/or additional provisions, which must be met when dangerous goods are transported on roll on/roll off vessels because of the structural differences between Ro-Ro and conventional vessels.

A Ro-Ro ship has one or more decks, either close or open, not subdivided in any way and normally run the entire length of the vessel, carrying goods which are normally loaded and unloaded in a horizontal direction.

Table of segregation of cargo transport units on board of Ro-Ro ships.

Segregation between ship-born barges on barge-carrying ships

- When a ship borne barge is loaded with two or more substances with different requirements for segregation, the most stringent segregation applicable should be applied should be applied.
- “Away from” and “separated from” require no segregation between ship-borne barges.
- “Separated by a complete compartment or hold from” means, for barge carrying ships with vertical holds, that separate holds are required. On barge carrying ship having horizontal barge levels, separate barge levels are required and the barges should not be in the same vertical line.
- “Separated longitudinally by an intervening complete compartment or hold from” means, for barge carrying ships with vertical holds, separation by an intervening hold or engine room is required. For horizontal barge levels, separate barge levels and a longitudinal separation by at least two intervening barge spaces is required.

Find dangerous goods list? Present it as additional information

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Marine pollutant

Special requirements apply to the transport by sea substances, material or articles, which are known or suspected to possess properties which pollute the marine environment.

These must be carried out in accordance with the requirements of Annex III of MARPOL 73/78, the provisions of which are encompassed within the Code.

Temperature control

Certain substance, mainly organic peroxides and self-reactive substance of Class 4.1, must be carried at low temperature.

In the Dangerous Goods List the properties and observation column identify substances, which are affected.

Health and environment - EMS - emergency procedures

In order to assist vessels with advice regarding the actions to be taken on board in emergencies involving dangerous goods (fire or spillage), IMO has published a guide, Emergency Procedures for Ships carrying Dangerous Goods (EmS).

The guide should be used as follows:
1. Before any accident occurs the "Introduction to the Emergency Schedules" must be incorporated into the ship's training regime.
2. In the event of an emergency consult the "General Guidelines)
3. Obtain detailed advice for the specific cargo involved in the "Emergency Schedules"

1. CARRIAGE OF DANGEROUS GOODS

1.1. Refer to appropriate interntional regulations, standards, codes and recommendations when carrying dangerous goods

Recommendations of the safe use of pesticides in ships

The Recommendations provide guidance on the measures which should be taken on board ships and cargo units loaded on ships to control and eradicate pests (insects and rodents) and thus prevent damage to equipment and cargo, food contamination, or the spread of disease and infection.

Pollution caused by dangerous goods

Annex II in MARPOL 73/78 includes requirements to prevent pollution from dangerous goods, which are transported as packages, I n containers, in transportable tanks or in road-tankers (onshore).

We can avoid dangerous goods falling over board and harming the marine environment. If this should happen anyway, it is important that the substance can be identified by a properly marked package.

Dangerous good shall be stowed in such a way that the danger for the marine environment is reduced as much as possible without reducing safety on board.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

General loading, carriage and unloading precautions

A number of accidents have occurred as a result of improper loading and unloading of solid bulk cargoes. It shall be noted that solid bulk cargoes have to be properly distributed throughout the ship to provide adequate stability and to ensure that the ship's structure is never overstressed. Furthermore, the shipper shall provide the master with adequate information about the cargo to ensure that the ship is properly loaded.

Preventing the structure being overstressed

A general cargo ship is normally constructed to carry cargoes in the range of 1.39 to 1.67 cubic metres per tonne when loaded to full bale and deadweight capacities. When loading a high-density solid bulk cargo, particular attention shall be paid to the distribution of weights to avoid excessive stresses, taking into account that the loading conditions may be different from those found normally and that improper distribution of such cargo may be capable of stressing either the structure under the load or the entire hull.

To set out exact rules for the distribution of loading is not practicable for all ships because the structural arrangements of each vessel may vary greatly. The information on proper distribution of cargo may be provided in the ship's stability information booklet or may be obtained by the use of loading calculators, if available.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Aiding stability

Having regard to regulation II-1/22.1 of SOLAS Convention, a stability information booklet shall be provided aboard all ships subject to the Convention. The master shall be able to calculate the stability for the anticipated worst conditions during the voyage as well as that on departure and demonstrate that the stability is adequate.

Shifting divisions and bins, of adequate strength, shall be erected whenever solid bulk cargoes, which are suspected of readily shifting, are carried in tween-deckcargo spaces or in only partially filled cargo spaces. As far as practicable, high-density cargoes shall be loaded in the lower hold cargo spaces in preference to tween-deck cargo spaces.

When it is necessary to carry highdensity cargoes in tween-decks or higher cargo spaces, due consideration shall be paid to ensure that the deck area is not overstressed and that the ship's stability is not reduced below the minimum acceptable level specified in the ship's stability data.

Loading and unloading

- Cargo spaces shall be inspected and prepared for the particular cargo which is to be loaded.

- Due consideration shall be paid to bilge wells and strainer plates, for which special preparation is necessary, to facilitate drainage and to prevent entry of the cargoes into the bilge system.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

- Bilge lines, sounding pipes and other service lines within the cargo space shall be in good order.

- Because of the velocity at which some high-density solid bulk cargoes are loaded, special care may be necessary to protect cargo space fittings from damage. To sound bilges after the completion of loading may be effective to detect damage on cargo space fittings.

- As far as practicable, ventilation systems shall be shut down or screened and air conditioning systems placed on recirculation during loading or discharge, to minimize dust ingress into the living quarters or other interior spaces.

- Due consideration shall be paid to minimize the extent to which dust may come into contact with moving parts of deck machinery and external navigational aids.

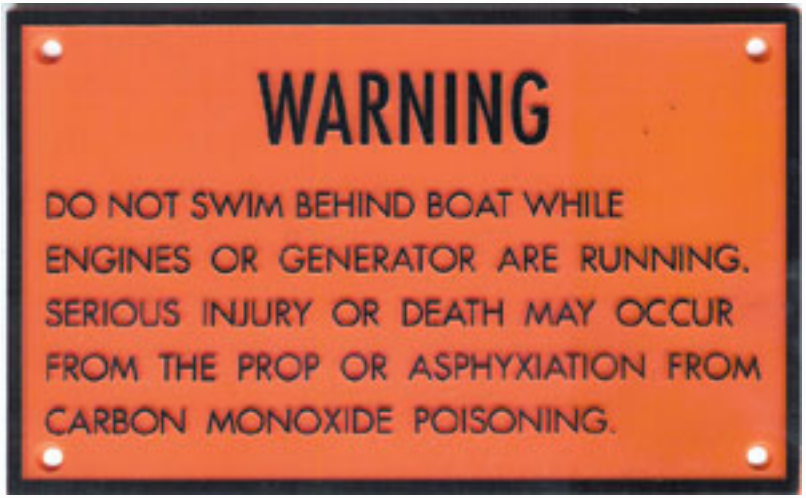
Safety of personel and ship

General requirements

Prior to and during loading, carriage and discharge of a solid bulk cargo, all necessary safety precautions shall be observed. A copy of the instructions on emergency response and medical first aid relevant to incidents involving dangerous goods in solid form in bulk shall be on board.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes



<u>Poisoning, corrosive and asphyxiation hazards</u>

Some solid bulk cargoes are susceptible to oxidation, which may result in oxygen depletion, emission of toxic gases or fumes and self-heating. Some cargoes are not liable to oxidize but may emit toxic fumes, particularly when wet. There are also cargoes which, when wetted, are corrosive to skin, eyes and mucous membranes or to the ship's structure. When these cargoes are carried particular attention shall be paid to protection of personnel and the need for special precautions to be taken prior to loading and after unloading.

Appropriate attention shall be paid that cargo spaces and adjacent spaces may be depleted in oxygen or may contain toxic or asphyxiating gases, and that an empty cargo space or tank which has remained closed for some time may have insufficient oxygen to support life.

Many solid bulk cargoes are liable to cause oxygen depletion in a cargo space or tank. These include, but are not limited to, most vegetable products and forest products, ferrous metals, metal sulphide concentrates and coal cargoes.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Prior to entry into an enclosed space aboard a ship, appropriate procedures shall be followed taking into account the recommendations developed by the Organization. It is to be noted that, after a cargo space or tank has been tested and generally found to be
safe for entry, small areas may exist where oxygen is deficient or toxic fumes are still present.

When carrying a solid bulk cargo that is liable to emit a toxic or flammable gas, and/or cause oxygen depletion in the cargo space, the appropriate instrument(s) for measuring the concentration of gas and oxygen in the cargo space shall be provided.

Emergency entry into a cargo space shall be undertaken only by trained personnel wearing self-contained breathing apparatus and protective clothing and always under the supervision of a responsible officer.

Heath hazards due to dust

To minimize the chronic and acute risks associated with exposure to the dust of some solid bulk cargoes, the need for a high standard of personal hygiene of those exposed to the dust cannot be overemphasized. Precautions, including the use of appropriate breathing protection, protective clothing, protective skin creams, adequate personal washing and laundering of outer clothing, shall be taken as necessary.

Flammable atmosphere

Dust of some solid bulk cargoes may constitute an explosion hazard, especially while loading, unloading and cleaning. This risk can be minimized by ventilating to prevent the formation of a dust-laden atmosphere and by hosing down rather than sweeping.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Some cargoes may emit flammable gases in sufficient quantities to constitute a fire or explosion hazard. Where this is indicated in the cargo schedule in this Code or by the cargo information provided by the shipper, the cargo spaces shall be effectively ventilated as necessary.

The atmosphere in the cargo spaces shall be monitored by means of an appropriate gas detector. Due consideration shall be paid to the ventilation and monitoring of the atmosphere in the enclosed spaces adjacent to the cargo spaces.

Ventilation

Unless expressly provided otherwise, when cargoes which may emit toxic gases are carried, the cargo spaces shall be provided with mechanical or natural ventilation; and, when cargoes which may emit flammable gases are carried, the cargo spaces shall be provided with mechanical ventilation.

If maintaining ventilation would endanger the ship or the cargo, it may be interrupted unless this would produce a risk of explosion.

When continuous ventilation is required by the schedule for the cargo in this Code or by the cargo information provided by the shipper, ventilation shall be maintained while the cargo is on board, unless a situation develops where ventilation would endanger the ship.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Ventilation openings shall be provided in holds intended for the carriage of cargoes that require continuous ventilation. Such openings shall comply with the requirements of the Load Line Convention as amended for openings not fitted with means of closure.

Ventilation shall be such that any escaping hazardous gases, vapours or dust cannot enter the accommodation or other interior spaces in hazardous concentrations. Due consideration shall be given to prevent escaping hazardous gases, vapours or dust from reaching enclosed work areas. Adequate precautions shall be taken to protect the personnel in these work areas.

When a cargo may heat spontaneously, ventilation other than surface ventilation shall not be applied. On no account shall air be directed into the body of the cargo.

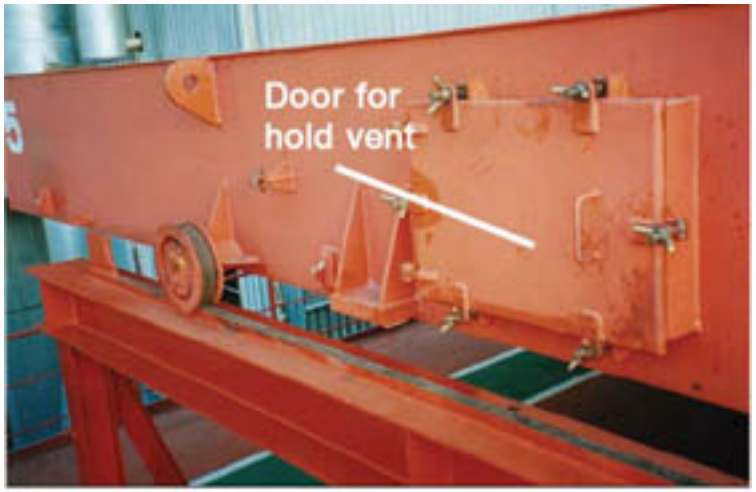


Fig. 15.1 Hold ventilator set into hatch panel

Fig. 15.2 Hold vent set into cover, upper side open

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Assesment of acceptability of consignments for safe shipment

Indentification and classification

Each solid bulk cargo in this Code has been assigned a Bulk Cargo Shipping Name (BCSN). When a solid bulk cargo is carried by sea it shall be identified in the transport documentation by the BCSN. The BCSN shall be supplemented with the United Nations (UN) number when the cargo is dangerous goods.

If waste cargoes are being transported for disposal, or for processing for disposal, the name of the cargoes shall be preceded by the word "**WASTE**".

Correct identification of a solid bulk cargo facilitates identification of the conditions necessary to safely carry the cargo and the emergency procedures, if applicable.

Solid bulk cargoes shall be classified, where appropriate, in accordance with the UN Manual of Tests and Criteria, part III. The various properties of a solid bulk cargo required by this Code shall be determined, as appropriate to that cargo, in accordance with the test procedures approved by a competent authority in the country of origin, when such test procedures exist. In the absence of such test procedures, those properties of a solid bulk cargo shall be determined, as appropriate to that cargo, in accordance with the test procedures prescribed in appendix 2 to this Code.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Provision of information

The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect.

1. The BCSN when the cargo is listed in this code. Secondary names may be used in addition to the BCSN	6. the stowage factor	11. toxic or flammable gasses which may be generated by cargo, if applicable
2. the cargo group (A and B, A, B or C)	7. the need for trimming and the trimming procedures, as necessary	12. flammability, toxicity, corrosiveness and propensity yo oxygen depletion of the car
3. the IMO Class of the cargo, if applicable	8. the likelihood of shifting, including angle of repose, if applicable	13. self-heating properties of the cargo, and the need for trimming, if applicable
4. the UN number preceded by letters UN for the cargo, if applicable	9. additional information in the form of a certificate on the mousture content of the cargo and its transportable moisture limit in the case of a concentrate or other cargo which may liquefy	14. properties on emission of flammable gasses in contact with water, if applicable
		15. radioactive properties, if applicable
5. the total quantity of the cargo offered	10. likelihood of formation of a wet base (see subsection 7.2.3. of this Code)	16. any other information required by national authorities

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Information provided by the shipper shall be accompanied by a declaration. An example of a cargo declaration form is shown bellow. Another form may be used for cargo declaration. As an aid to paper documentation, Electronic Data Processing (EDP) or Electronic Data Interchange (EDI) techniques may be used.

<table>
<tr><td colspan="2">Shipper/consigner</td><td colspan="3">Transport document #</td></tr>
<tr><td colspan="2">Consignee/reciever</td><td colspan="3">Vessel</td></tr>
<tr><td colspan="2">Load port</td><td colspan="3" rowspan="2">Instructions or other matters</td></tr>
<tr><td colspan="2">Discharge port</td></tr>
<tr><td colspan="2">General description of the cargo (type of material/particle size)</td><td colspan="3">Gross mass (kg/tonnes)</td></tr>
<tr><td colspan="5">Specification of bulk cargo Stowage factor Angle of repose Trimming procedures Chemical properties' if potential hazard*

*Class, UN no. or "MHB"</td></tr>
<tr><td colspan="2">Group of the cargo
o Group A and B*
o Group A*
o Group B
o Group C *For cargoes which may liquefy</td><td colspan="3">Transportable moisture limit

Moisture content at shipment</td></tr>
<tr><td colspan="2">Relevant special properties of the cargo</td><td colspan="3">Additional certificate(s)*
o Certificate of moisture content and transportable moisture limit
o Weather certificate
o Exemption certificate
o Other (specify)
*if required</td></tr>
<tr><td colspan="2">DECLARATION

I herby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded</td><td colspan="3">Name/status, company/organisation of signatory

Place and date

Signature on behalf of shipper</td></tr>
</table>

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

To obtain the nececary information, the shipper shall arrange for the cargo to be properly sampled and tested. The shipper shall provide the ship's master or his representative with the appropriate certificates of test, if required in this Code.

When a concentrate or other cargo which may liquefy is carried, the shipper shall provide the ship's master or his representative with a signed certificate of the TML, and a signed certificate or declaration of the moisture content. The certificate of TML shall contain, or be accompanied by the result of the test for determining the TML.

The declaration of moisture content shall contain, or be accompanied by, a statement by the shipper that the moisture content is, to the best of his knowledge and belief, the average moisture content of the cargo at the time the declaration is presented to the master.

When a concentrate or other cargo which may liquefy is to be loaded into more than one cargo space of a ship, the certificate or the declaration ofmoisture content shall certify the moisture content of each type of finely grained material loaded into each cargo space.

Not with standing this requirement, if sampling according to internationally or nationally accepted standard procedures indicates that the moisture content is uniform throughout the consignment, then one certificate or declaration of average moisture content for all cargo spaces is acceptable.

Where certification is required by the individual schedules for cargoes possessing chemical hazards, the certificate shall contain, or be accompanied by, a statement from the shipper that the chemical characteristics of the cargo are, to the best of his knowledge, those present at the time of the ship's loading.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Sampling procedures

• Physical property tests on the consignment are meaningless unless they are conducted prior to loading on truly representative test samples.
•Sampling shall be conducted only by persons who have been suitably trained in sampling procedures and who are under the supervision of someone who is fully aware of the properties of the consignment and also the applicable principles and practices of sampling.

Prior to taking samples, and within the limits of practicability, a visual inspection of the consignment which is to form the ship's cargo shall be carried out. Any substantial portions of material which appear to be contaminated or significantly different in characteristics or moisture content from the bulk of the consignment shall be sampled and analysed separately. Depending upon the results obtained in these tests, it may be necessary to reject those particular portions as unfit for shipment.

Representative samples shall be obtained by employing techniques which take the following factors into account:

1 - the type of material;
2 - the particle size distribution;
3 - composition of the material and its variability;
4 - the manner in which the material is stored, in stockpiles, rail wagons or other containers, and transferred or loaded by material-handling systems such as conveyors, loading chutes, crane grabs, etc.;
5 - the chemical hazards (toxicity, corrosivity, etc.);

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

6 - the characteristics which have to be determined: moisture content, TML, bulk density/stowage factor, angle of repose, etc.;
7 - variations in moisture distribution throughout the consignment which may occur due to weather conditions, natural drainage, e.g., to lower levels of stockpiles or containers, or other forms of moisture migration; and
8 - variations which may occur following freezing of the material.

Throughout the sampling procedures, utmost care shall be taken to prevent changes in quality and characteristics. Samples shall be immediately placed in suitable sealed containers which are properly marked.
Unless expressly provided otherwise, sampling for the test required by this Code shall follow an internationally or nationally accepted standard procedure. Not with standing this provision, where the composition or characteristics of the cargo are variable for any reason, a test to determine the TML shall be conducted again after it is reasonably assumed that such variation has taken place.

Interval between sampling/testing and loading for TML moisture content determination

• Sampling and testing for moisture content shall be conducted as near as practicable to the time of loading.
• If there has been significant rain or snow between the time of testing and loading, check tests shall be conducted to ensure that the
moisture content of the cargo is still less than its TML. The interval between sampling/testing and loading shall never be more than seven days.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Sampling procedures for concentrate stockpiles

Samples of frozen cargo shall be tested for the TML or the moisture content after the free moisture has completely thawed.

It is not practicable to specify a single method of sampling for all consignments since the character of the material and the form in which it is available will affect the selection of the procedure to be used. In the absence of internationally or nationally accepted standard sampling procedures, the following sampling procedures for concentrate stockpiles may be used to determine the moisture content and the TML of mineral concentrates. These procedures are not intended to replace sampling procedures, such as the use of automatic sampling, that achieve equal or superior accuracy of either moisture content or TML.

• Sub-samples are taken in a reasonably uniform pattern, where possible from a levelled stockpile.
• A plan of the stockpile is drawn and divided into areas, each of which contains approximately 125 t, 250 t or 500 t depending on the amount of concentrate to be shipped.

Such a plan will indicate the number of sub-samples required and where each is to be taken. Each subsample taken is drawn from approximately 50 cm below the surface of the designated area.

• The number of sub-samples and sample size are given by the competent authority or determined in accordance with the following scale:

– Consignments of not more than 15,000t:
– One 200 g sub-sample is taken for each 125 t to be shipped.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

– Consignments of more than 15,000 but not more than 60,000 t:
– One 200 g sub-sample is taken for each 250 t to be shipped.
– Consignments of more than 60,000 t:
– One 200 g sub-sample is taken for each 500 t to be shipped.

• Sub-samples for moisture content determination are placed in sealed containers (such as plastic bags, cans or small metallic drums) immediately on withdrawal for conveyance to the testing laboratory, where they are thoroughly mixed in order to obtain a fully representative sample.

• Basic procedural steps include:

- identification of consignment to be sampled;
- determination of the number of individual sub-samples and representative samples which are required;
- determinations of the positions from which to obtain sub-samples and the method of combining such sub-samples to arrive at a representative sample;
- gathering of individual sub-samples and placing them in sealed containers;
- through mixing of sub-samples to obtain the representative sample; and
- placing the representative sample in a sealed container if it has to be shipped to a test laboratory.

1. CARRIAGE OF DANGEROUS GOODS

1.2. Exercise precautions during loading, unloading and care during the voyage for the carriage of dangerous, hazardous and harmful cargoes

Documentation required on board the ship carrying dangerous goods

Each ship carrying dangerous goods in solid form in bulk shall have a special list or manifest setting forth the dangerous goods on board and the location thereof, in accordance with SOLAS regulation VII/7.

A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest.

When dangerous goods in solid form in bulk are carried appropriate instructions on emergency response to incidents involving the cargoes shall be on board.

Cargo ships of 500 gross tonnages and over constructed on or after 1 September 1984 and cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992, subject to SOLAS regulation II-2/19.4 (or II-2/54.3), shall have a document of compliance when carrying dangerous goods in solid form in bulk except class 6.2 and class 7.

NOTE - there are a lot of information on the side of the slides which cannot be added to the PDF presentation, and which are important part of the whole function (as when you tap on the text/photo another window pops-up. It can only be seen in InDesign and it should also be checked.