Mekong River Commission
For Sustainable Development



Safety Booklet for Vessel Crew

on the carriage, handling, and storage of dangerous goods in the Lower Mekong Basin



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1. Introduction

1.1. Objectives

This safety booklet is designed to help ensure the safe, efficient, and environmentally responsible carriage, handling, and storage of Dangerous Goods (DGs) along the Mekong River. Its main objectives are to:

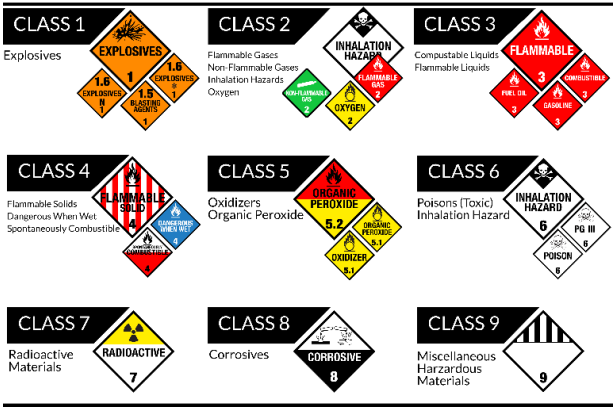
- Promote safe practices aboard vessels, especially tankers.
- Inform vessel crew of potential dangers and associated risks.
- Provide clear guidance on how to avoid accidents and protect both crew and the environment.
- Support sustainable inland waterway transport in the Lower Mekong Basin.

For more comprehensive information, scan the QR code to access the full version of the *Safety Book for Vessel Crew and Port Staff on the Carriage, Handling, and Storage of Dangerous Goods in the Lower Mekong Basin*.

1.2. Classification of Dangerous Goods

DGs (IMO,2018) are classified into nine classes based on the type of hazard they present. Some of these classes are further divided into divisions, depending on the specific characteristics of the substance.

Below is an overview of the nine classes and their divisions[1]:



Substances (IMO,2018), which include mixtures and solutions, are assigned to one of the classes 1-9 according to the hazard they present, with the most predominant hazard determining their classification. The following lists the classes and their divisions:

[1] Image source: https://www.saferack.com/guide-hazmat-placards-un-numbers/

Class 1 - Explosives (divided into 6 hazard divisions):

- Division 1.1: substances and articles which have a mass explosion hazard
- Division 1.2: substances and articles that have a projection hazard but not a mass explosion hazard
- Division 1.3: substances and articles that have a fire hazard and either a minor blast hazard or a minor projection 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 that do not have a mass explosion hazard

Class 2 - Gases are subdivided further according to the primary hazard of the gas during transport:

- 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

Note: The numerical order of the classes and divisions does not indicate their level of danger.

1.3. Dangerous goods transport along the Mekong River

In the Mekong River Basin (MRC, 2012), inland waterway transport of DGs is currently limited to the following seven classes:

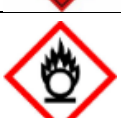
Label	Class and Type
	Fireworks (Class 1: explosives)

Label	Class and Type
	Liquefied petroleum gas (LPG) (Class 2: gases)
	Fuel oil, diesel oil, kerosene oil, gasoline (MOGAS, M92, M95, M97), and jet fuel (all Class 3: flammable liquids)
	Lignite (brown coal) (Class 4: flammable solids)
	Ammonium nitrate and fertilizers (Class 5: oxidizing substances)
	Pesticides, mercury, and sodium cyanide used for gold mining (Class 6: toxic and infectious substances)
	Several packaged DGs, mostly transported in containers (Class 9: miscellaneous dangerous substances)

Note: DGs from **Class 7 (Radioactive Material)** and **Class 8 (Corrosive Substances)** are currently **not** transported along the Mekong River (MRC, 2012).

If the DGs you're handling are not listed here, always consult local authorities and refer to the International Maritime Dangerous Goods (IMDG) Code for proper guidance (IMO,2018).

1.4. Possible hazards and risks of DGs

Possible hazards and risks	Label
Class 1: Fireworks: risks for explosion.	
Class 2: Liquefied Petroleum Gas (LPG): risks for ignition and irritation of the eyes and respiratory system.	
Class 3: Flammable liquids: risk of burning fire with toxic fumes, very hot and fast.	
Class 4: Lignite (brown coal): risk for spontaneously catching fire by releasing a toxic gas.	
Class 5: Fertilizers: risk of oxidizing other materials with spontaneous combustion. **Ammonium Nitrate** becomes explosive when organic materials are added.	
Class 6: Pesticides, mercury, and cyanide: risk of causing death or harm to human health if swallowed or inhaled by skin contact.	

Class 9: Miscellaneous: As a diverse range of articles and substances is included in this class, there are no general risks that can be linked to the class overall.	



Firework explosion



LPG ignition



Brown coal ignition

Note: Detailed information on specific risks and hazards for each class of DGs (MRC, 2012) can be found in Appendix 1 in the full book (MRC, 2014).

1.5. Signs and Signals

Safety and health signs use colors and symbols to provide safety and health information or instructions for a specific object, activity, or situation at work (TGDGP, 2002):

Color	Meaning or purpose	Instructions and information
Red	Prohibition sign	Dangerous behaviour Danger alarm Stop, shut down, Emergency cut-out devices, Evacuate Fire-fighting equipment Identification and location

Yellow or amber	Warning sign	Warning sign Be careful, take precautions Examine
Blue	Specific behavior or action	Specific behavior or action Wear personal protective equipment
Green	Emergency escape, first aid sign	Doors, exits, routes, equipment, facilities No danger Return to normal

Warning signs (TGDGP, 2002)


Corrosive substances



Explosive atmosphere


Oxidizing substances


Flammable substances


Harmful/irritating substances


Infectious substances


Explosive substances


Radioactive material


Toxic substances

Prohibition signs (TGDGP, 2002)



No access



No fire or open flames



No drinking water



No pedestrians



No smoking



No water for fire extinguishing



Specific behaviour or action signs (TGDGP, 2002)


Ear protection


Eye protection


Face mask


Pedestrians


Protective clothes


Respirator mask


Safety gloves


Safety helmet


Safety shoes

Emergency escape and first aid signs (TGDGP, 2002)


First aid kit

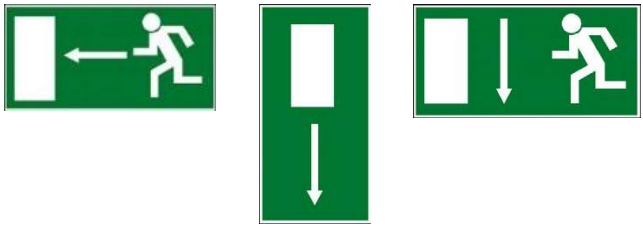

Stretcher


Emergency call


Eye shower


Emergency shower


Assembly point



Escape way/Emergency exit

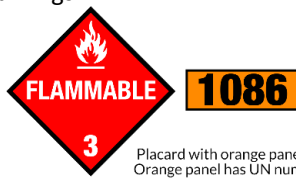
1.6. Labeling and marking

Labels and markings are used to identify the type of hazardous material being transported. These labels provide essential information to handlers and emergency responders. There are two types of labels:

1. **Hazard Class Labels:** Indicate the specific class of the DGs, as presented in Section 1.2. Examples of hazardous material (hazmat) placards and markings[2]:



Placard with UN number



Placard with orange panel
Orange panel has UN number

2. **Handling Instructions Labels**: Guide to proper handling and stowage of the DGs. Examples of handling labels:

[2] Image source: https://www.saferack.com/guide-hazmat-placards-un-numbers/



Magnetized material



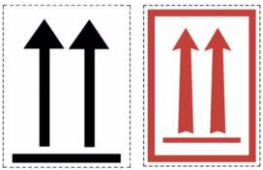
Time & Temperature Sensitive



fragile goods



Keep away from heat



Package orientation for liquid DGs

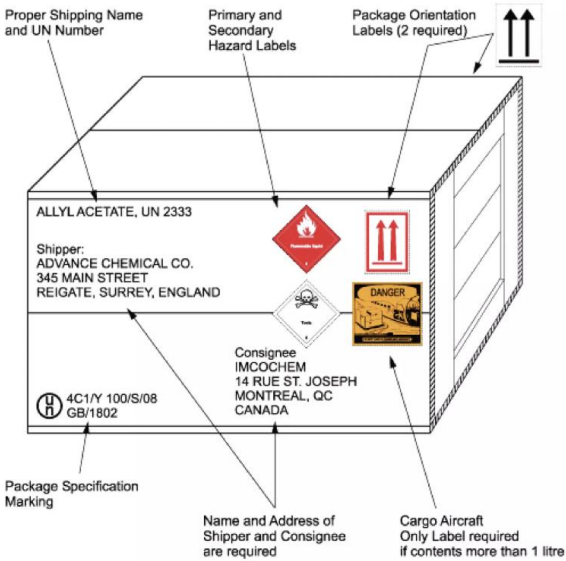


Cryogenic liquids

The Proper Shipping Name for the DGs and the corresponding UN Number, preceded by the letters "UN", are displayed on each package (IMO,2018). In the case of unpackaged articles, the marking can be on the article, cradle, handling, storage, or launching device. A detailed list of Proper Shipping Name and the corresponding UN Number can be found in Appendix 5 of the full book. A typical package marking is:

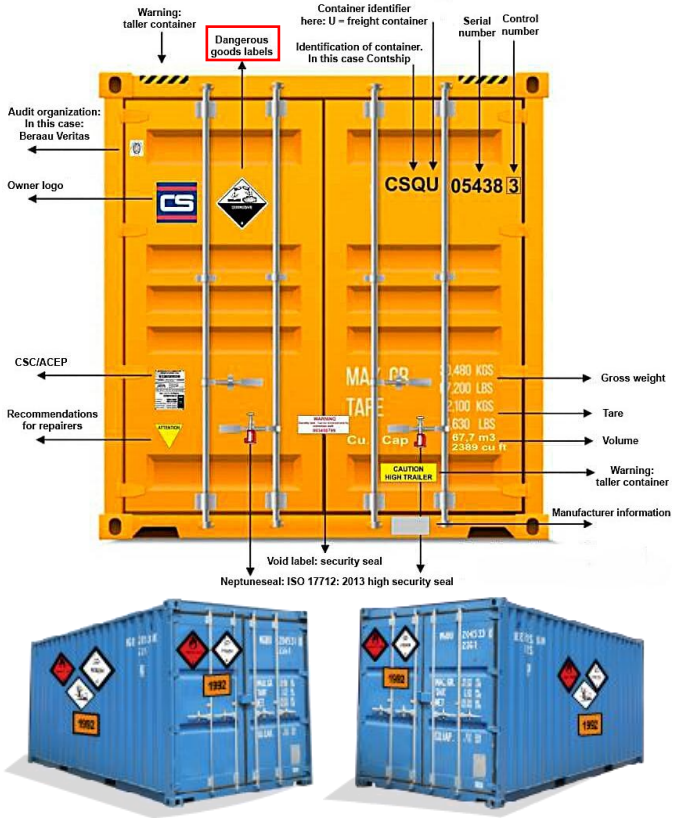
CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (caprylyl chloride) UN 3265.

Below (Tayfour, 2020) is an example of marking and labeling of DGs:



Once DGs are transported via a container, the container must be labeled as below[3]:

[3] Image source: https://www.leghorngroup.in/hazard-class-labels-adr-imo/



1.7. Key Responsibilities of Vessel Crew

The vessel crew has key responsibilities during the carriage, handling, and storage of DGs, which include:

1	**Training and Certification** ○ Ensure crew members handling DGs are appropriately trained and certified. ○ Conduct regular training on safety procedures and regulations.
2	**Documentation and Compliance** ○ Maintain accurate documentation of DGs on board. ○ Ensure compliance with all relevant regulations.
3	**Proper Stowage and Segregation** ○ Stow DGs in designated areas. ○ Use appropriate containers and packaging.
4	**Safety Equipment and Emergency Preparedness** ○ Ensure the availability and proper functioning of safety equipment. ○ Develop and practice emergency response plans for incidents involving DGs.
5	**Monitoring and Inspection** ○ Regularly inspect the storage areas. ○ Monitor DGs' condition throughout the voyage.
6	**Communication and Coordination** ○ Communicate with port authorities and relevant parties about the DGs. ○ Coordinate with local emergency services in case of a DG incident.

2. Training and Certification on Dangerous Goods

2.1. Appropriate training and certification

Appropriate training and certification are essential for safety and compliance. Here are some key steps:

1. **International Maritime Dangerous Goods (IMDG) Code Training**: Cargo vessels over 400 DWT and tankers over 150 DWT carrying significant quantities of DGs should have at least one crew member trained and certified in DG handling per the IMDG Code.
2. **Regular Refresher Courses**: Crew members should participate in regular refresher courses to stay updated with the latest regulations and best practices.
3. **Competency-Based Training**: Implementing competency-based training and assessment ensures crew members are knowledgeable and competent in handling DGs.
4. **Documentation and Records**: Maintain detailed training and certification records to ensure compliance and easy verification.

2.2. Regular training on safety procedures and regulations

The following information (TGDGP, 2002) should be provided regularly to the vessel crews:

Contents	Repetition
Properties of DGs and dangerous substances	Once a year (If there are new chemicals with other properties, the information must be given immediately)
What kind of personal protective equipment is available, and how to use it	Once a year
When personal protective equipment (PPE) must be replaced with new one	Once a year

Contents	Repetition
How to read operating instructions	Once a year
How to react in case of an emergency	Once a year, in combination with emergency training
Which information is essential for the supervisor or the fire brigade in case of an emergency	Once a year
How to handle a spillage	Once a year
How to fight a fire by using fire extinguishers	Once a year

3. Documentation and Compliance

The vessel crew should complete the following checklists to ensure the safe transport of DGs:

1	**Identification** ○ Verify the proper shipping name and UN/Identification number. ○ Ensure the classification of the goods, including hazard class and packing group.
2	**Packaging** ○ Use UN specification packaging. ○ Check for any special provisions or packing instructions.
3	**Marking** ○ Proper shipping name and UN/Identification number. ○ From and to addresses. ○ Quantity and any other shipment-specific markings.

4	**Labelling** ○ Primary and subsidiary hazard labels. ○ Handling labels (e.g., orientation arrows).
5	**Documentation** ○ Prepare the Shipper's Declaration for DGs. ○ Complete all necessary transport documents.
6	**Other Considerations** ○ Placarding, if required. ○ Special provisions or state/operator variations. ○ Ensure no incompatible dangerous goods are packed together.

Note: Sample forms (IMO,2018) for DG declaration and checklists can be found in Appendix 2 of the full book.

4. Proper Stowage and Segregation

The detailed stowage and segregation for each substance or material is provided in Part 3 - *Dangerous Goods List and limited quantities exceptions* (IMO,2018) of the IMDG Code.

4.1. Stowage

General provisions

- Where stowage is permitted on or under the deck, it is recommended to store items under the deck whenever possible. However, stowing them on deck is recommended for certain class 1 articles whose main hazard is producing smoke or toxic fumes.
- Fiberboard boxes and packages susceptible to water damage should be stored below the deck. If stored on deck, they must always be protected from exposure to weather or water.
- Stowage on deck should be prescribed in cases where:
  1. constant supervision is required; or
  2. accessibility is particularly required; or
  3. there is a substantial risk of the formation of explosive gas mixtures, development of highly toxic vapors, or unobserved corrosion of the ship.
- When DGs are stored on deck, it is essential to keep free and unobstructed access to hydrants and sounding pipes.
- At all times, the stowage of DGs must be organised in the following ways:
  - Ensure clear walkways and access to all facilities necessary for the safe operation of the ship.

- Ensure compliance with special stowage provisions for goods that pose hazards is met.

- Notwithstanding the stowage provisions given in the Dangerous Goods list (IMO,2018), empty uncleaned receptacles, which shall be stowed on deck only when full, may be stowed on deck or under deck in a mechanically ventilated cargo space. Empty uncleaned cylinders that carry a label of class 2.3 shall be stowed on deck only.
- Where it is necessary to prevent pressure build-up, decomposition, or polymerisation of a substance. The packages shall be stowed shaded from radiant heat, which includes protection from strong sunlight.
- When it is indicated in the Dangerous Goods List that the substances are to be stowed shaded from radiant heat. Stowage under the deck shall be "away from" sources of heat.
- Where, for certain dangerous goods, protection from sources of heat is required. This includes protection from sparks, flames, steam pipes, heating coils, top or side walls of heated fuel and cargo tanks, and bulkheads of machinery spaces. These bulkheads should be insulated to meet A-50 standards or similar, except when dealing with explosives. In that case, besides having an A-60 insulated bulkhead, there should also be extra space "away from" the explosives and other stowage.
- Portable tanks shall not be over-stowed by other cargo transport units. Unless they are designed for that purpose and transported in specially designed ships, or are specially protected to the satisfaction of the competent authority.

Stowage in relation to living quarters

- When stowage needs to be stored away from living areas, it is important to consider that vapours could still leak into living spaces, machinery spaces, and other work areas via entrances or other openings in bulkheads or through ventilation ducts.
- The criteria for identifying the substances, materials, and articles for which stowage is required are:
  1. volatile toxic substances;
  2. volatile corrosive substances;
  3. substances which, in moist air, produce toxic or corrosive vapours;
  4. substances that evolve strongly narcotic vapours;
  5. flammable, toxic, or corrosive gases of class 2.
- All infectious substances shall be stowed "separated by a complete compartment or held from" living quarters.

Stowage in relation to undeveloped films and plates, and mailbags

- Undeveloped photographic films and plates, and mailbags (which shall be assumed to contain them), shall be segregated from class 7 materials.

4.2. Segregation

Segregation groups

For segregation, DGs having certain similar chemical properties have been grouped as listed below:

Segregation Group Code	Segregation Group	Description
SGG1	1	Acids

Segregation Group Code	Segregation Group	Description
SGG2	2	ammonium compounds
SGG3	3	bromates
SGG4	4	chlorates
SGG5	5	chlorites
SGG6	6	cyanides
SGG7	7	heavy metals and their salts (including their organometallic compounds)
SGG8	8	hypochlorites
SGG9	9	lead and its compounds
SGG10	10	liquid halogenated hydrocarbons
SGG11	11	mercury and mercury compounds
SGG12	12	nitrites and their mixtures
SGG13	13	perchlorates
SGG14	14	permanganates
SGG15	15	powdered metals
SGG16	16	peroxides
SGG17	17	azides
SGG18	18	alkalis

Note: Further details on segregation groups can be found in Appendix 5 of the full book.

Special provisions for segregation

No segregation needs to be applied:

1. Between dangerous goods of different classes comprising the same substance but varying only in water content, such as sodium sulfide in classes 4.2

and 8, or for class 7 if the difference is due to quantity only.

2. Between dangerous goods that belong to a group of substances of different classes, but for which scientific evidence exists that they do not react dangerously when in contact with each other. The substances listed in the table below are compatible with one another.

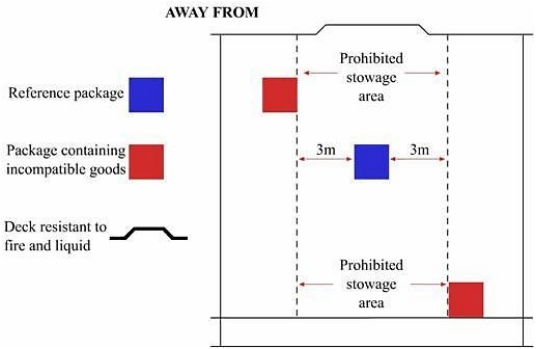
The following table shows the general segregation provisions between the various DG classes:

CLASS		1.1 1.2 1.5	1.3 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
Explosives	1.1, 1.2, 1.5	*	*	*	4	2	2	4	4	4	4	4	4	2	4	2	4	X
Explosives	1.3, 1.6	*	*	*	4	2	2	4	3	3	4	4	4	2	4	2	2	X
Explosives	1.4	*	*	*	2	1	1	2	2	2	2	2	2	X	4	2	2	X
Flammable gases	2.1	4	4	2	X	X	X	2	1	2	2	2	2	X	4	2	1	X
Non-toxic, non-flammable gases	2.2	2	2	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X
Toxic gases	2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
Flammable liquids	3	4	4	2	2	1	2	X	X	2	2	2	2	X	3	2	X	X
Flammable solids (including self-reactive substances and solid desensitized explosives)	4.1	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact with water, emit flammable gases	4.3	4	4	2	2	X	X	2	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
Organic peroxides	5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Infectious substances	6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
Radioactive material	7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	X	X	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

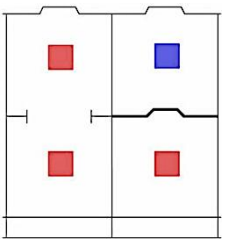
The numbers and symbols in the table above have the following meanings:
1 – “away from”
2 – “separated from”
3 – “separated by a complete compartment or hold from”
4 – “separated longitudinally by an intervening complete compartment or hold from”
X – the Dangerous Goods List shall be consulted to verify whether there are specific segregation provisions
* – segregation provisions between class 1 substances should be consulted with the local authority and follow the IMDG Code

Segregation of packages containing DGs and stowed in the conventional way

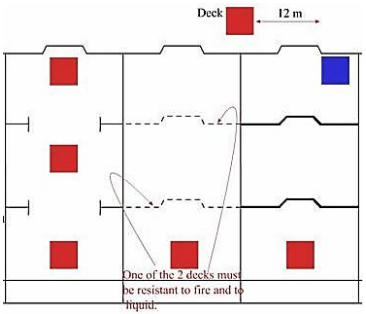
- **Away from**: Effectively segregated so that the incompatible goods cannot interact dangerously in the event of an accident. However, they may be transported in the same compartment, hold, or on deck, provided a minimum horizontal separation of 3 metres is maintained.



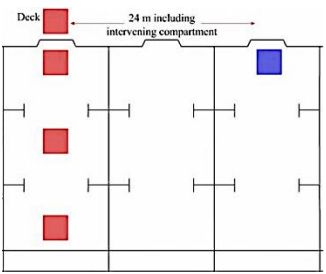
1. ***Separated from***: Segregated in different compartments or holds when stowed under deck. Provided the intervening deck is resistant to fire and liquid, a vertical separation, such as in different compartments, may be accepted as equivalent to this segregation. For on-deck stowage, this segregation means a separation of at least 6 metres horizontally.



2. ***Separated by a complete compartment or hold from***: Goods can be separated either vertically or horizontally. If the decks in between are not fire and liquid-resistant, then only a longitudinal separation (by a complete compartment or hold) is acceptable. For on-deck storage, this means **a horizontal separation of at least 12 meters**. The same distance applies if one package is on deck and the other is in an upper compartment.



- ***Separated longitudinally by an intervening complete compartment or hold from***: In addition to vertical separation, if there is a package under the deck and one on the deck, there must be **a minimum distance of 24** meters between them, including a complete compartment. For on-deck storage, this means maintaining a longitudinal separation of **at least 24 meters.**



Segregation in cargo transport units

- DGs that must be segregated from each other shall not be transported in the same cargo transport unit. The exception being DGs that are required to be separated "away from" each other, these goods may be transported in the same cargo transport unit with the approval of the competent authority. In such cases, an equivalent standard of safety shall be maintained.
- DGs stowed in the conventional way shall be segregated from goods transported in open cargo transport units.
- DGs stowed in the conventional way shall be segregated from goods transported in closed cargo transport units, with the exception:
  1) Where "away from" is required, no segregation between the packages and the closed cargo transport units is required.
  2) Where "separated from" is required, the segregation between the packages and the closed cargo transport units follows the "away from" requirements.

4.3. Transport of Cargo Transport Units on Board Ships

General provisions for cargo transport units (CTUs)

- Cargo transport units (CTUs) used for transporting DGs shall be adequately maintained and have adequate strength to resist the possible stress imposed by the conditions of the services in which they are employed.
- Before loading, the CTUs used for transporting DGs shall be examined for external signs of damage, leakage, or sifting of contents. Any CTU found damaged, leaking, or sifting

shall not be accepted for shipment until repairs have been completed or after the damaged packages have been removed.

- If it becomes necessary to open the doors of a CTU for any reason, consideration of the type of cargo inside and whether any leaks might have caused dangerous levels of toxic or flammable vapours, or changed the oxygen level to be too high or too low, must be assessed. Extra care when approaching and entering the inside of the unit must be exercised if such a possibility exists.
- When packing Class 4.3 substances in a CTU, be aware that heavy condensation can form on the internal surfaces. The amount of condensation depends on how much moisture is inside the closed unit and the temperature changes it experiences. To reduce this risk, it is important to keep the moisture in the packaging and secure materials as low as possible.

- Where DGs are required to be kept as cool as practicable, this requirement shall be applied to the CTU as a whole.

Fumigated units

- Fumigated CTUs should not be loaded on board until enough time has passed for the fumigation gas to spread evenly and reach a safe, consistent concentration throughout the entire cargo.

- Twenty-four hours is usually sufficient for this purpose. Unless the doors of a fumigated unit have been opened to allow the fumigant gas(es) and residues to be ventilated

entirely, or the unit has been mechanically ventilated. Ventilated containers shall be marked with the ventilation date on the fumigated warning sign(s).

- The fumigation warning sign(s) shall be removed when the fumigated goods or materials have been unloaded.
- The master shall be informed prior to loading a fumigated unit.

Transport of DGs of class 1 in CTU

- Special structural provisions may be applicable to CTUs used for the stowage of class 1 DGs. The special provisions that are applicable are indicated under "stowage" in the Dangerous Goods List of the IMDG Code.
- In ships other than specially fitted container ships, cargo transport units shall be stowed in the bottom layer only.
- Loading and unloading cargo transport units containing Class 1 goods (explosives) onto a ship requires special caution. It is important to follow the safety guidelines and precautions provided in the IMO Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas to ensure safe handling.

4.4. Transport of DGs in Shipborne Barges

Barge loading

- Packages must be carefully inspected before being loaded onto a shipborne barge. Any packages that are damaged, leaking, or releasing contents must not be loaded. Additionally, any excessive water, snow, ice, or dirt stuck to

the packages should be removed before loading to ensure safe and secure transport.

- Packages containing DGs, portable tanks, cargo transport units, and any other goods within a shipborne barge shall be properly immobilised by stowage and adequately braced and secured for the voyage.
- Packages should be loaded in such a way that there will be a minimum likelihood of damage to them and to any fittings during transport. Fittings on packages or portable tanks (tank containers) shall be adequately protected.
- Where solid bulk materials possessing chemical hazards are transported in shipborne barges, it shall be ensured that the cargo is evenly distributed, properly trimmed, and always secured.
- Shipborne barges into which packaged dangerous goods or solid bulk materials possessing chemical hazards are to be loaded shall be examined visually for hull hatch cover damage, which could impair watertight integrity. If there is evidence of such damage, the shipborne barge may not be used to transport packaged DGs or solid bulk materials possessing chemical hazards and shall not be loaded.

Stowage of shipborne barges

- When loading shipborne barges carrying packaged dangerous goods or solid bulk materials with chemical hazards onto barge-carrying ships, the stowage must follow the specific requirements listed in the Dangerous Goods List of the IMDG Code. If a barge contains more than one type of substance that needs to be stored in different

places, then the substances must be stowed on deck.

Ventilation and condensation

- Where class 4.3 substances or materials are hazardous only in bulk, having similar properties, or being subject to the same segregation provisions, or substances liable to spontaneous heating are transported in shipborne barges, the possibility that the shipborne barges could suffer from heavy condensation on the internal surface shall be kept in mind. The degree of such condensation is dependent upon the amount of moisture contained within a closed shipborne barge, in addition to the temperature variances experienced. The risk is minimized if the moisture content of packaging and securing materials is kept low.
- If it becomes necessary to remove the hatch cover from a shipborne barge for any reason, consideration of the type of content inside and whether any leaks might have caused dangerous levels of toxic or flammable vapours, or changed the oxygen level to be too high or too low must be assessed.

- Shipborne barges containing a residue of a dangerous cargo or shipborne barges loaded with empty packaging containing a residue of a dangerous substance shall comply with the same provisions as barges loaded with the substance itself.

Fire protection

- Shipborne barges loaded with significant quantities of packaged dangerous goods or solid bulk materials

possessing chemical hazards shall be stowed as far as practicable from accommodation and navigational areas.

- Where it is recommended that a cargo shall be kept as cool as practicable, this provision shall be applied to the shipborne barge as a whole, unless suitable alternative measures are provided.
- When loading shipborne barges carrying packaged dangerous goods or solid bulk materials with chemical hazards onto barge-carrying ships that have fixed firefighting or fire-detection systems for each barge, it is important to make sure these systems are properly connected to the barge and working correctly.
- When packaged dangerous goods or solid bulk materials possessing chemical hazards are loaded in shipborne barges aboard barge-carrying ships that have fixed fire-fighting systems or fire-detection systems installed in individual barge holds, it is important to make sure the ventilation openings on the barges are left open. This allows the firefighting medium (such as fire suppressant gases or water) to enter the barge effectively in case of a fire.
- When ventilation ducts are provided to individual shipborne barges, the ventilation fans must be secured when firefighting agents are being introduced into the barge hold. This ensures that the firefighting medium can enter the barges effectively to suppress any fire.

4.5. Handle and Store DGs Onboard Vessels in the LMB

- Check that DGs are properly labelled, packed, marked, and documented before acceptance (follow the instructions on

page 15 and refer to the IMDG code (IMO,2018) for more instructions).

- Secure dangerous cargo to protect vessel crew and port staff.
- Follow specific loading instructions: e.g., orientation, stacking, dryness, temperature control (see a sample of loading and unloading checklist in Appendix 2 of the full book).
- Prevent the movement of dangerous goods packages.
- Protect class 2, 3, 4, and 5 goods from heat and sunlight, and ensure ventilation. Follow these segregation rules:

CLASSES							
		2	3	4	5	6	9
2	Flammable gases						
3	Flammable liquids						
4	Flammable solids						
5	Oxidizing substances						
6	Toxic substances						
9	Miscellaneous						

Should be compatible

Should be kept apart by at least 3 m

Should be segregated by at least 5 m

- Class 1 goods (explosives) must always be kept separate from other classes of DGs in an isolated location.
- Class 7 goods (radioactive material) can only be transported on specialized vessels, complying with the Regulations for the Safe Transport of Radioactive Material (IAEA, 2018).

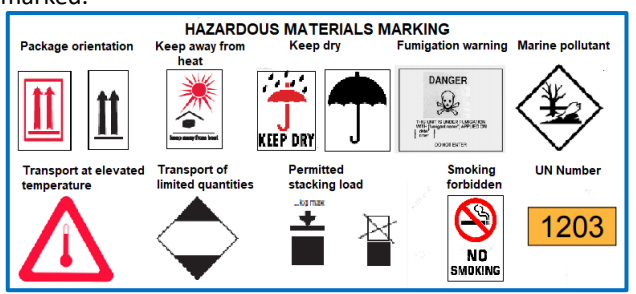
Note: For more details on handling and storage, refer to Appendix 1 of the full book.

4.6. Prevent Exposure to Possible Hazards

- Know which materials onboard are hazardous.



- Read and understand emergency procedures.
- Always use the proper personal protection equipment (PPE) (see page 42)
- Ensure all hazardous materials are properly labeled and marked.



- Ensure that all dangerous materials are properly stored (see page 19).
- Never smoke, eat, or drink while handling dangerous or hazardous materials.
- Report all cases of damaged packing, potential leaks, or spills.
- Specific precautions to be taken for the different classes of dangerous goods are in Appendix 1 of the full book.

4.7. Transfer, Loading, and Unloading Packaged DGs

Use a checklist (see a sample checklist in Appendix 2 of the full book) to ensure both port and vessel representatives understand the transfer and precautions (IMO, 2007).

1	Use appropriate PPE (see the instructions on page 42).
2	Check if the DGs are packaged so that they do not pose a risk to life, health, property, or the environment.
3	Check that the front quays are only used for the short-term storage of DGs.
4	Check if an overall inventory of the DGs and a layout plan of the port is available.
5	Check that incompatible hazardous substances are adequately separated from each other during transport and storage.
6	Check if properly designed and implemented work practices and procedures are available.
7	Do not smoke or introduce any other sources of ignition.



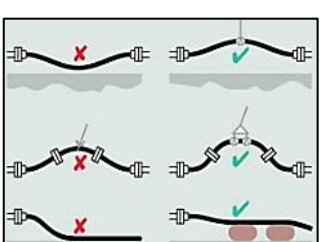


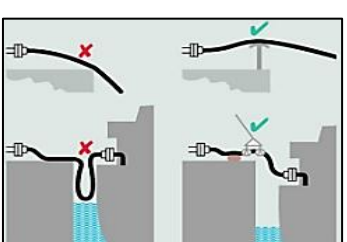
4.8. Loading and Unloading Liquid DGs in Bulk

Use a checklist to ensure both port and vessel representatives understand the transfer and precautions (see a sample checklist in Appendix 2 of the full book).



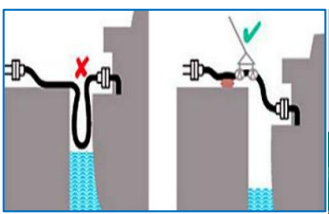
1	Before starting an oil transfer operation, ensure that an emergency response plan is in place.
2	Use appropriate PPE (see the instructions on page 42).
3	Check if the transfer area is clear of any ignition sources.
4	Check if both port tanks and vessels are properly grounded.
5	Check if the pump system is tested periodically.
6	Inspect the fuel transfer hoses visually. Hoses must not lay in the water between the vessel and the dock.
7	Check if all connections are liquid-tight and secured.
8	Do not smoke or introduce any other sources of ignition.





4.9. Important Issues during Bunkering

- Complete a bunker **checklist** before bunkering (see a sample bunkering checklist in Appendix 2 of the full book).
- Ensure bunker hoses are properly hung and clear.
- Check bunker hoses for leak-free connections.
- Prohibit smoking and open flame repairs.
- Have resources ready to contain oil leaks or overflows.



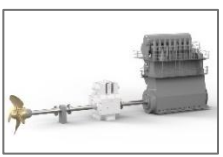


4.10. Maintenance and testing of critical equipment

Cargo vessels and tankers transporting DGs in large quantities should have a Maintenance, Inspection, and Testing Program (MITP) for critical equipment such as generators, steering gear, engine room, pump room and cargo pumps, cargo hoses, firefighting, and lifesaving appliances. The MITP should be consulted regularly and should include:

1	the establishment of maintenance intervals.
2	the methods and frequency of inspection and testing.
3	the specifications of the measuring equipment to be used.

4	the establishment of appropriate acceptance criteria.
5	the assignment of responsibility for inspection and maintenance activities.
6	the definition of reporting requirements and mechanisms.



Shaft generator



Pump room



Cargo hoses

4.11. Safe Working in Confined Spaces

Ensure that all these factors related to working in confined spaces have been properly addressed:

Risks (fire, explosion, toxic gas)
Communications equipment
Atmosphere testing equipment
Ventilation
Suitable working equipment
Personnel Protection Equipment
Access and exit
Fire prevention & firefighting
Static electricity
Smoking
Emergency arrangements
First aid equipment









4.12. Safe Hot Work

	**Remove Flammable Materials:** Keep flammable items away from the hot work area.
	**Inspect Equipment:** Check all tools and equipment before use.
	**Wear PPE:** Use appropriate PPE (follow the PPE instructions on page 42).
	**Follow Confined Space Procedures:** Use proper safety measures in confined spaces (follow the working in confined spaces instructions on page 37).
	**Turn Off Gas and Dampen the Area:** After finishing, turn off the gas and dampen the area to prevent fires.

5. Safety Equipment and Emergency Preparedness

5.1. Code of Safe Working Practices

- Cargo vessels and tankers carrying DGs other than in limited quantities and shipping companies should have a Code of Practice on Safety and Health (ISM) (IMO, 2010) containing instructions and procedures on safe operations shared with all personnel. The ISM should include:

1	Company and workers' responsibilities
2	Occupational safety and health systems
3	Operational procedures
4	Dangerous Goods handling procedures
5	Emergency arrangements
6	Environmental protection measures
7	Provision, care, and use of PPE and work equipment
8	Procedures for internal and external audits



It is advised to consult this code when necessary**.** Emergency response instructions and procedures should be developed in the event of an accident, explosion, fire, or spill.

5.2. Personnel Protective Equipment (PPE)

PPE must be used when risks cannot be minimized through safe working practices.



PPE \ Tasks	Normal port work	Machine operations	Cargo operations	Bunkering	Confined spaces	Painting	Cleaning work
Safety suit							
Safety shoes							
Safety helmet							
Gloves							
Eye protection							
Ear defenders							
Dusk mask							

Essential | Maybe needed | Not needed

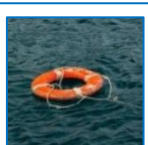
5.3. Life-Saving Equipment

All inland vessels and tankers carrying dangerous goods other than in limited quantities should have the following Live Saving Appliances (LSA) (IMO, 2017):

- an (inflatable) life raft sufficient to accommodate the total number of persons on board.
- lifebuoys (for vessels at least equal in number to half the total number of persons on board);
- lifejackets suitable for a person weighing 52 kg. or more;
- Immersion suits and thermal protective aids.
- Rocket parachute flares and hand flares.



Life raft



Lifebuoy



Buoyant apparatus



Life jacket







Lifejacket: Clip together both buckles and pull the strap until adjusted around your waist

5.4. Firefighting Equipment

The Shipboard Emergency Plan should include the locations and details of all fire-fighting equipment. Fires should be controlled and extinguished by isolating their source and using the correct extinguishing agents (IMO, 2015).

Recommendation on the suitability of each extinguisher for different fire types:

Types of fire / Type of extinguisher	**Flammable solids** e.g. paper, plastic, wood Class A	**Flammable liquids** e.g. paint, petrol, oil Class B	**Flammable gases** e.g. butane, CNG, LPG Class C	**Flammable metals** e.g. titanium, magnesium Class D	**Electrical equipment** e.g. cables, computers, switchboards Class E	**Cooking oils and fats** e.g. chip pans, fryers Class F
Water	✓	✗	✗	✗	✗	✗
Wet chemical	✓	✗	✗	✗	✗	✓
Foam	✓	✓	✗	✗	✗	
Dry powder	✓	✓	✓		✓	
Carbon dioxide				✗	✓	

Key:	✓	Recommended Most effective in this type of fire.		Limited Maybe effective on small fires.	✗	Not Suitable Not effective in this type of fire.

Dry powder extinguishers should be used for explosives, flammable solids, and chemicals. Foam extinguishers can also be used for flammable liquids.

Follow the **P.A.S.S.** method, a basic fire extinguisher training technique, to discharge the extinguisher and put out the fire:

	**P – Pull** out the safety pin on the extinguisher
	**A – Aim** the nozzle at the base of the fire and stand at a safe distance.
	**S – Squeeze** the handles together to release the extinguishing agent that has been trapped inside. Release the handles to halt the discharge.
	**S – Sweep** the base of the fire from side to side until it appears to be out. Look around. Aim, Squeeze, and Sweep if the fire re-ignites.

5.5. Emergency Planning

- All cargo vessels of more than 400 DWT carrying DGs or with more than 15 persons and tankers of more than 150 DWT should have a **Shipboard Emergency Plan (SEP)**. The SEP includes:

1.	Crew duties and chain of command for emergencies.
2.	Actions to raise the alarm and initial emergency control.
3.	Emergency action plan (time frame, firefighting, rescue, medical treatment, waste disposal).
4.	Use of life-saving appliances.

5.	Location and details of fire-fighting equipment.
6.	Coordination guidelines with authorities.

- All tankers of more than 150 DWT and vessels of more than 400 DWT should have a Ship Oil Pollution Emergency Plan (SOPEP). The SOPEP outlines crew duties to stop or minimize the spill of oil or other noxious/hazardous substances and to mitigate its effects.

Consult these documents before handling DGs!

5.6. Risk Assessment



In addition to the risks and hazards specific to the ship or tanker, which must be assessed on the basis of a checklist (MRC, 2013) for an inland vessel transporting DGs (see sample checklists for risk and hazard assessment in Appendix 2 of the full book). It is recommended to perform a risk assessment that identifies, evaluates, and manages potential hazards associated with the transportation of hazardous materials. The risk assessment should include:

1. **Hazard Identification:** Classify DGs, identify specific risks, and determine compatibility with other substances.
2. **Risk Evaluation:** Evaluate the probability of an incident, assess the potential severity, and evaluate the potential exposure.
3. **Safety and Preventive Measures:** Implement safety measures to prevent incidents, ensure that the crew is trained, and keep accurate documentation about the cargo.

4. **Emergency Response Planning:** Develop contingency plans for different types of accidents, including measures to control and mitigate spills, and establish clear communication channels.
5. **Legal and Regulatory Compliance:** Ensure that the operations comply with all relevant national and international regulations.
6. **Monitoring and Review:** Continuously monitor risks throughout the voyage, adjusting the risk management strategy as needed.

5.7. Special Provisions in the Event of an Incident and Fire Precautions involving DGs

General provisions in the event of incidents

When dealing with incidents involving flammable gases or liquids with a flashpoint of 60°C (closed-cup) or below, all ignition sources (such as naked lights, unprotected light bulbs, and electric hand tools) should be avoided.

In general, it is recommended to wash spills on deck overboard using plenty of water. If a dangerous reaction with water is possible, wash from as far away as safely possible. The ship's master must use their judgment when deciding to dispose of spilled dangerous goods overboard, always prioritizing the crew's safety. For liquid spills, use inert absorbent materials.

Where possible, toxic, corrosive, and/or flammable vapours in under-deck cargo spaces should be dispersed before undertaking any emergency action. When a mechanical

ventilation system is used, care must be taken to ensure that flammable vapours are not ignited.

If there is any reason to suspect leakage of these substances, entry into a hold or cargo space should not be permitted until the master or responsible officer has taken all safety considerations into account and permits entry.

Under other circumstances, emergency entry into the hold should only be undertaken by a trained crew wearing self-contained breathing apparatus and other protective clothing. After dealing with spillages of substances corrosive to steel and cryogenic liquids, a careful inspection for structural damage should be carried out.

If any person responsible for the transport or opening of packages containing infectious substances becomes aware of any damage or leakage from such packages, they must:

- Avoid handling the package or keep handling to a minimum.
- Inspect adjacent packages for contamination and put aside any that have been contaminated.
- Inform the appropriate public health authority or veterinary authority, and provide information on any other countries of transit where persons may have been exposed to danger.
- Notify the consignor and/or the consignee.

General fire precautions

Fire prevention for DGs is achieved by practicing good seamanship and observation. It is recommended to follow these precautions closely:

- Keep combustible material away from ignition sources.
- Protect a flammable substance by adequate packing.
- Reject damaged or leaking packages.
- Stow packages protected from accidental damage or heating.
- Segregate packages from substances liable to start or spread fire.
- Where appropriate and practicable, stow dangerous goods in an accessible position so that packages in the vicinity of a fire may be protected.
- Enforce a prohibition of smoking in dangerous areas and display clearly recognisable "NO SMOKING" notices or signs.
- Lighting, power cables, and fittings should be maintained in good condition to prevent short circuits, earth leakages, and sparking. Cables or equipment found to be unsafe should be disconnected.
- Where a bulkhead is required for segregation purposes, cables and conduit penetrations of the decks and bulkheads should be sealed against the passage of gas and vapors.
- When stowing dangerous goods on deck, the position and design of auxiliary machinery, electrical equipment, and cable runs should be considered to avoid ignition sources.

5.8. Rescue Operations

Man(s) overboard

1.	**Raise the Alarm**: Shout “Man Overboard!”.
2.	**Deploy Lifebuoy**: Immediately throw a lifebuoy or any flotation device toward the person in the water.
3.	**Mark the Location**
4.	**Maneuver the Vessel**: Turn the vessel towards the side where the person fell to keep them in sight.
5.	**Post Lookouts**: Assign someone to watch the person in the water.
6.	**Inform Authorities**: Notify the master and contact nearby vessels and emergency services.
7.	**Prepare for Recovery**: Prepare any equipment needed to retrieve the person from the water.

Quick and coordinated actions are crucial to a person’s safety.

Seriously injured person(s)

1.	**Assess the Situation**: Quickly evaluate the severity of the injury and ensure the safety of all crew members.
2.	**Provide First Aid**
3.	**Gather Information**: incident and nature of the injury.
4.	**Seek Medical Advice**: Contact medical professionals for guidance on further treatment.
5.	**Transport to Medical Facility**: Transport the injured person to a hospital or medical facility as soon as possible.
6.	**Report the Incident**: Notify the relevant authorities and document the incident as required.

Prompt and appropriate care is crucial for injured person(s).

5.9. Fire/Explosion

In case of a fire or explosion on an inland waterway vessel, the crew should:

1.	Sound the fire alarm and start firefighting.
2.	Avoid dangerous substances, smoke, and vapours; evacuate enclosed spaces.
3.	Be ready to give first aid and resuscitation for toxic gas exposure.
4.	Follow applicable “Emergency Plan” firefighting measures.
5.	Contact the shipping line or rescue centre for expert advice.
6.	Ensure availability of: ○ PPE and Life Saving Appliances (LSA); ○ Blankets, stretchers, breathing apparatus, and resuscitation equipment; ○ Fire suits and protective clothing.









Resuscitation



Fire blanket



Fire suit

5.10. Dangerous Goods/Oil Spillage

In case of dangerous goods/oil spillage, the crew should:

1.	Sound the alarm.
2.	Avoid contact with dangerous substances, vapours, and gases.
3.	Wear chemical-resistant protective clothing and self-contained breathing apparatus.
4.	Be ready to provide first aid and resuscitation for toxic gas exposure.
5.	Follow applicable “Emergency Plan” procedures.
6.	Contact a rescue coordination centre for expert advice.
7.	Inform authorities immediately in case of an oil spill so they can start the Contingency Plan.
8.	Use absorbent pads and dispersants to control pollution.



Breathing apparatus



Absorbent pads



Dispersant

5.11. First Aid

The Medical First Aid guide (WHO, 1998) contains treatments that are relevant for the handling and carriage of DGs:



Cardiopulmonary resuscitation



Symptoms: Not breathing, but the heart is beating, or breathing, but the heart has stopped.
Treatment: Begin resuscitation immediately - depress the breastbone 4 to 5 cm at 80 to 100 times per minute and alternate 12 breast depressions with 4 mouth-to-mouth breaths.

Lack of oxygen



Symptoms: Difficulty in breathing, a rapid heart pulse, possibly followed by unconsciousness.
Treatment: Give oxygen by means of a face mask and squeeze the bag steadily at about 12 times a minute.

Eye or skin exposure to chemicals



Symptoms: Pain, redness, irritation, swelling, blistering, and ulceration.
Treatment: Immediate washing with copious amounts of water for ten minutes, and remove the casualty to the hospital as soon as possible.

Pain relief

Symptoms: Moderate or severe pain
Treatment: Administer paracetamol and seek medical advice.

Note: Always seek medical advice in all cases.

6. Monitoring and Inspection

6.1. Regular Inspections of DGs

Vessel crews shall regularly inspect the storage areas and monitor the condition of the DGs throughout the voyage. Here are some steps for inspections to ensure safety and compliance:

1. **Scheduled Inspections**: Conduct inspections at regular intervals to ensure ongoing compliance. This could be weekly, monthly, or as required by regulations and policies.
2. **Visual Inspection**: Check for any signs of damage, leaks, or spills in the storage area. Ensure all containers are appropriately labelled, and hazardous materials are stored according to their classification.
3. **Verify Documentation**: Ensure that all necessary documentation, including keeping the Safety Data Sheets (SDS) up to date and readily available.
4. **Emergency Equipment**: Verify that emergency equipment such as fire extinguishers, spill containment kits, and PPE is in good condition and easily accessible.
5. **Record Keeping**: Maintain detailed records of all inspections, including any identified issues and the actions taken to resolve them.

Safety Data Sheets provide product safety and DG transportation requirements. An SDS must state the following information on the DG:

- Section 1 - Identification: Product identifier and chemical identity
- Section 2 – Hazard(s) identification
- Section 3 - Composition and information on ingredients

- Section 4 - First-aid measures
- Section 5 - Fire-fighting measures
- Section 6 - Accidental release measures
- Section 7 - Handling and storage, including how the chemical may be safely used
- Section 8 - Exposure controls and personal protection
- Section 9 - Physical and chemical properties
- Section 10 - Stability and reactivity
- Section 11 - Toxicological information
- Section 12 - Ecological information
- Section 13 - Disposal considerations
- Section 14 - Transport information
- Section 15 - Regulatory information
- Section 16 - Any other relevant information

Note: A sample Safety Data Sheet can be found in Appendix 2 of the full book.

6.2. Inspection of Tanks

Tanks (TGDGP, 2002) must be marked with the chemical name of the contents and labeled with the enlarged symbol. Inspection can be categorized as regular in-service inspection or regular out-of-service inspection. An in-service inspection using a checklist may be a simple, regular walk around the tank. Out-of-service inspection is a detailed inspection of the complete tank structure using a standard.

Tank wall internal inspection of individual (stand-alone) tanks not used for the storage of toxic or odorous class 3 products (flammable liquids with a flashpoint of 55 °C or higher, but not above 100 °C) needs to be carried out at least every 15 years.

However, more frequent tank inspections are recommended due to the weather and other exceptional circumstances such as humidity, salinity, and corrosivity. For groups of tanks (tank farms with the same chemicals), only every fourth tank needs to be inspected, according to the scheme for individual tanks. For the other tanks, the period of 15 years can be extended to 20 years if no significant failures are found. However, if substantial failures are discovered, the other tanks in the group must be inspected as soon as possible.

- External inspection is done by measuring the thickness of walls and fixed roofs of all the tanks at least every 5 years.
- The minimum required thickness of the steel plates is 2 mm.
- Floating roof seals require inspection at least every six months. Regular seal checks and early repairs are recommended.
- Vents should be externally inspected at least once a year to assess their opening, closing, and sealing performance.
- Valves, steps, platforms, and instruments need to be inspected regularly (once a month) to ensure good performance.
- Earth wires have to be inspected once a month.
- In this case, a group of tanks is considered to be situated close to each other, constructed in the same way, storing the same product, and used under the same conditions.
- Fire systems require annual inspections. This includes tests on whether the material is ready for immediate use.

6.3. Inspection of Hoses and Pipes

The hoses and pipes used for filling the tanks or for the mode of transport need to be inspected before use. They should withstand a pressure test of 4 bar. This test must be conducted annually. If the hoses and pipes are used for substances with high pressure, the test pressure must be higher according to the substance.

The hoses and pipes must be checked visually to ensure they are not damaged. If they are damaged, they have to be replaced immediately. The material of the hoses and pipes must be suitable for handling dangerous substances, which means steel requires a special coating to resist corrosive substances.

6.4. Accident Reporting

In the event of an accident or distress, the master must notify and file an Accident Report with local authorities within 24 hours. For oil or hazardous substance spills, the master must immediately inform local or national authorities and file a Pollution Report.

Any crew member can report incidents to the ship owner, who then must inform their navigation administration.

The **Accident Report** should include the following:

- Detailed vessel information.
- Detailed information (time, location, weather conditions).
- Vessel activity at the time of the accident.
- Type of accident.
- Description of who, what, when, where, and how the accident occurred.

- Ideas of why the accident happened (if any).
- Description of the actions taken immediately after the accident.
- Description of what has been done or proposals for what should be done to prevent this accident from reoccurring.
- Details of the person completing the report.

The **Pollution Report** should include the following:

- Detailed vessel information.
- Detailed accident or incident information.
- Pollution details.
- Description of the immediate actions after the accident.
- Description of what has been done or proposals for what should be done to prevent this accident from recurring.
- Details of the person completing the report.

7. Useful Communication and Coordination

7.1. Cambodia

Emergency rescue:	N/A
Police:	117
Ambulance:	119
Firefighting:	118

National Committee for Disaster Management (NCDM)
New Building St.516, Toul Sangke Commune, Russey Keo District, Phnom Penh
Office Tel: +855 (0)23 864 298 or +855 (0)23 211 171 or +855 (0) 23 882 605
Office fax: +855 (0)23 882 045
Email: administration@ncdm.gov.kh or caccdm@yahoo.com

General Department of Waterway, Maritime Transport and Ports
Office Tel: +855 (0)12 835 867 or +855 (0)23 864110
Office fax: +855 (0)23 864110
Email: mmd@online.com.kh

7.2. Lao PDR

Emergency rescue:	N/A
Police:	1191
Ambulance:	1195
Firefighting:	1190

MPWT Department of Waterways (DOW)
Office Tel: +856 (0)21-416430
Office fax: +856 (0)21-416430

Department for Disaster Management and Climate Change
Office Tel: +856 (0)21 264 543 or +856 (0) 21 262 120
Office fax: +856 (0)21 263 799 or +856 (0)21 262 120

7.3. Thailand

Emergency rescue:	911
Police:	191
Ambulance:	1669
Firefighting:	199

Marine Department of Thailand (Spill notification point)
1278 Yotha Road, Talardnoi Samphanthawong, Bangkok 10100
Office Tel: +66 (0)2 233 1311 ext. 8
Hotline (24 hours a day): 1199
Office fax: +66 (0)2 238 3017
Email: marine@md.go.th

Marine Office 1, Chiang Rai Branch, Marine Department
Office Tel: + 66 (0)5377 7460
Mobile: + 66 (0)81 168 4997
Office fax: + 66 (0)5377 7461
Email: chiangrai@md.go.th
VHF: 156.05 MHz

Chiang Sean Marine Police, Royal Thai Marine Police
Office Tel: + 66 (0)53 777 003
Mobile: + 66 (0)81 627 0201
Office fax: + 66 (0)53 777 003
Email: s_police34@hotmail.com

Chiang Sean Riverine Unit Station, Royal Thai Navy
Office Tel: +66 (0)53 650 755
Mobile: + 66 (0)87 045 0434

Office fax: +66 (0)53 650 755
Email: thainavy@thainavynorth.com

Chiang Saen Port
Office Tel: +66 (0)53 777 455 or +66 (0)22 695 421
Office fax: +66 (0)53 777 455
Email: csp2port@yahoo.com

Oil Industry Environmental Safety Group Association
555 PTT Phrakanong Bld., Ard-Narong Road, Khlong-Toey, Bangkok 10260
Office Tel: +66 (0)2239 7955 or +66 (0)2239 7956
Office fax: +66 (0)2239 7917
Email: info@iesg.or.th

7.4. Viet Nam

Emergency rescue:	112
Police:	113
Ambulance:	115
Firefighting:	114

Vietnam Maritime and Waterway Administration
No. 8, Pham Hung street, Mai Dich Ward, Cau Giay District, Hanoi
Office Tel: +84.024.37683065
Office fax: +84.024.37683058
Email: cuchhvn@vinamarine.gov.vn

Port Authority 3 (Ho Chi Minh City)
292/37/6-8, Binh Loi Street, Ward 13, Binh Thanh District, Ho Chi Minh City
Office Tel: +84 (0) 28 35531982
Email: cangvu3.viwa@mt.gov.vn

Port Authority 4 (Can Tho)
366D Cach Mang Thang Tam Street, Bui Huu Nghia Ward, Binh Thuy District, Can Tho City
Office Tel: +84 (0)710. 3 88 30 3
Email: admin@pa4.gov.vn

National Committee for Search and Rescue (VINASARCOM)
26 Hoang Dieu Street, Ba Dinh, Hanoi
Office Tel: +844 (0)37333664

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9. Personal Notes



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