SA Masterclass on Special Cargo Handling

Shippers' Academy

SA COLOMBO

AN ENTERPRISE OF SA INTERNATIONAL

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Topics covered

- Dangerous Goods/Hazardous Goods
- Heavy/Outsized cargo or Out of Gauge (OOG)
- Perishable Cargo/ Reefer Cargo

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SPECIAL CARGO ?

Special cargo means cargo which requires special procedures for acceptance, handling and loading. The main types of special cargo are:

- **Dangerous Goods/Hazardous Goods**
- Fragile Cargo - glassware or electronics
- **Heavy/Outsized cargo**
- Human Remains
- Live Animals
- Magnetized Materials - iron, nickel, cobalt & Silver.
- **Perishable Cargo/ Reefer Cargo**
- Valuable/vulnerable cargo – Gold, Platinum, cameras, laptops, mobile phones,
- Wet Cargo - any goods producing liquid.

Our focus on today would be to the cargo in **bold** fonts only

Dangerous Goods/Hazardous Goods

On completion of this session , you would be able to get some knowledge in:-

- What do you mean by Hazardous & Dangerous?
- IMO and IMO Conventions in relation to Hazardous Cargo
- IMDG Code and why it is important?
- Development of IMDG Code
- What is DGL?
- Classification of Hazardous Cargo
- Segregation, Packing and Labeling
- Shipper’s Declaration of making a booking Application
- Application Process – Flow Chart
- Steps to follow in Sea Carriage
- MSDS & Why it is important?
- Parties involved and responsibilities vested on them
- “Root causes” ultimately led to disasters in some recent incidents
- Q & A session

DANGEROUS or HAZARDOUS !.....

dangerous vs. hazardous

Two of the very common words that can be found in the warning signs are “danger” and “hazard.” While both refer to a risk or threat, despite they are two distinct words.

Hazard is a condition that presents a risk or threat to the environment as well as an individual’s life, property, or health.

Danger is a situation where an individual is put at risk or is susceptible to a possible hazard.

dangerous vs. hazardous continued....

Hazard is usually used to refer to risky situations that are very serious or life-threatening while danger is used in a more general way to refer to risky situations that may cause slight or serious damage.

The word **“hazard”** comes from the Arabic word “az-zahr” while the word **“danger”** comes from the Latin word “dominus.”

What are the forms of hazardous cargo?

Such as :-

Solids, liquids, or gases that can harm people, other living organisms, property, or the environment unless they are dealt with an extra care. They are often subject to chemical regulations.

IMO ?

It is the International Maritime Organization (IMO) which is a United Nations specialized agency.

what are the IMO Conventions in relation to Hazardous Cargo?

The Carriage of dangerous goods and marine pollutants in sea-going ships is respectively regulated in the International Convention for the Safety of the Life at Sea **(SOLAS)** and the International Convention for the Prevention of pollution from Ships **(MARPOL).**

1. The safety of life at sea – **SOLAS (The first version was adopted in 1914, in response to the Titanic disaster happen during April 14, 1912 – April 15, 1912)**

2. Prevention of pollution from ships – **MARPOL (Adopted in 1978 in response to a spate of tanker accidents in 1976-1977)**

Sri Lanka is a member of

UN -since 1955, IMO --since 1972

Other main conventions relating to maritime safety and security and ship/port interface

- COLREG - Convention on the International Regulations for Preventing Collisions at Sea
- FAL - Convention on Facilitation of International Maritime Traffic
- LL - International Convention on Load lines
- SAR - International Convention on Maritime Search and Rescue
- CSC - Convention of Safe Containers (under PES or ACEP)
- SFV - Convention of Safety of Fishing Vessels
- STP - Special Trade Passenger Ships agreement

There are other conventions held relating to prevention of marine pollution and covering liability and compensation.

PES - Periodic Examination Scheme is the original approach that is currently generally used by small operators and requires the display of the "next examination date" or "NED" on the CSC plate.

ACEP - Approved Continuous Examination Program is the system currently used by most container owners and operators. This continuous examination is done once in every 30 months.

Website :- Convention on IMO

The International Convention The safety of life at sea – SOLAS

The main objective of the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships. In other words to provide necessary guide lines :-

- For the structure of the ships
- For machinery & electrical equipment
- For fire protection
- For life-saving appliances
- For radio communications
- For navigation safety, and cargo carriage.

The top priority of Safety of life at Sea (SOLAS) is to prevent human injury or loss of life, and to avoid damage to the environment and the ship. Personal safety or safety of life at sea comes at the top of the priority list as there is no loss that is considered greater than the loss of human life.

The International Convention for the Prevention of Pollution from Ships (MARPOL)

What are the benefits of MARPOL?

The MARPOL Convention has regulations to **prevent and reduce pollution from ships, both from accidents like oil spills and from a ship's daily operations**.

What are the important points of **MARPOL?**

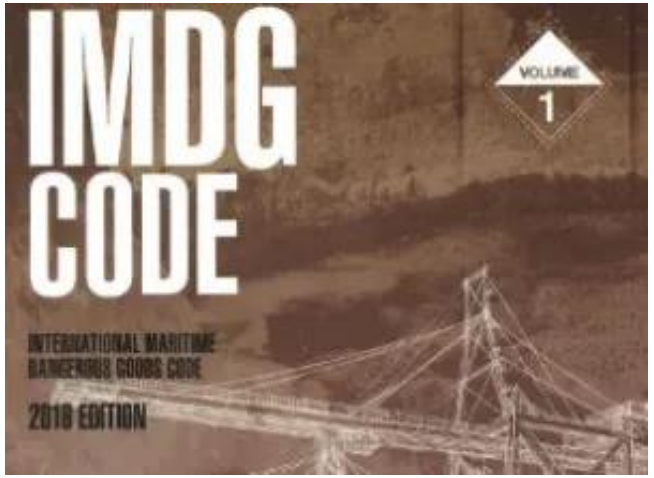
- Prevention of Pollution by Oil
    a. Requirements for the cargo area of Oil tankers.
    b. Control of Operational Discharge of Oil.
    c. Discharges outside special areas.
    d. Discharges in special areas.
    e. Oil Discharge Monitoring and Control System.
- Prevention of Pollution by Sewage from Ships
- Prevention of Pollution by Garbage from Ships
- Prevention of Air Pollution from Ships

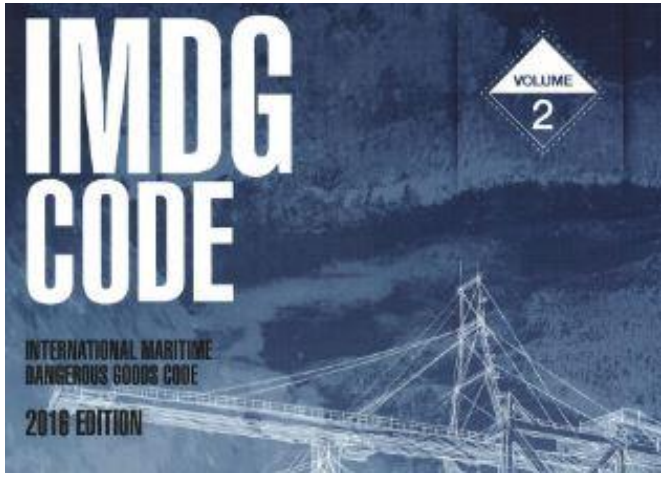
The International Maritime Dangerous Goods (IMDG) Code

For the safety of ships and their crews together with the safety of stevedores handing such dangerous cargo the packaging, marking, stowage and segregation of dangerous cargo is covered under an International Code of Safe Practice, the International Maritime Dangerous Goods Code (IMDG Code). This code's principles help keep people safe, prevent ship damage and preserve the environment.

Why the IMDG code is important?

- Enhance the safe carriage of dangerous goods
- While facilitating the free unrestricted movement of such goods
- Prevent pollution to the environment





IMDG code contents

- **Part 1** General Provisions, definitions and training, Application, Definitions, Training, Security, general provisions for radioactive material
- **Part 2** Classification, The IMDG goods classes, 1 to 9, explained
- **Part 3** Dangerous goods list – contained in Volume 2
- **Part 4** Packing and tank provisions
- **Part 5** Consignment procedures
- **Part 6** Construction and testing of packages, IBCs, portable tanks, MECGs and road tank vehicles
- **Part 7** Provision concerning transport operations

Development of the IMDG Code

- 1960 Safety of Life at Sea Conference recommended that Governments need to adopt an uniform international code for the transport of dangerous goods by sea
- To supplement the regulations contained in the 1960 International Convention for the Safety of Life at Sea (SOLAS).
- The code has been adopted by more than 50 countries, representing over 85% of world tonnage.
- The latest edition of the IMDG code comes in 2 volumes and 1 supplement cover details of dangerous goods, all of which are subdivided into 9 classes

What is DGL? and how it is described?

The DGL is presented across 2 pages of the IMDG Code and is divided into 18 columns for each individual dangerous good listed.

- **Column 1 – UN Number**
- Contains the United Nations Number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods (UN List).

- **Column 2 – Proper Shipping Name (PSN)**
- Contains the Proper Shipping Names in upper case characters which may be followed by additional descriptive text in lower-case characters.

- **Column 3 – Class or Division**
- Contains the class and, in the case of class 1, the division and compatibility group.

- **Column 4 – Subsidiary Risk(s)**
- Contains the class number(s) of any subsidiary risk(s). This column also identifies if dangerous goods are marine pollutants by showing the letter 'P':

- **Column 5 – Packing Group**
- Contains the packing group number (i.e. I, II or III) where assigned to the substance or article.

- **Column 6 – Special Provisions**
- Contains a number referring to any special provision(s) indicated in chapter 3.3.

- **Column 7a – Limited Quantities**
- Provides the maximum quantity per inner packaging.

- **Column 7b – Excepted Quantities**
- Provides a code which can be referenced to determine the maximum quantity per inner and outer packaging.

- **Column 8 – Packing Instructions**
- Contains packing instructions for the transport of substances and articles.

- **Column 9 – Special Packing Provisions**
- Contains special packing provisions.

- **Column 10 – IBC Packing Instructions**
- Contains IBC instructions which indicate the type of IBC that can be used for the transport.

- **Column 11 – IBC Special Provisions**
- Refers to special packing provisions applicable to the use of packing instructions bearing the code 'IBC' in 4.1.4.2.

- **Column 12 – IMO Tank Instructions**
- This column is no longer used but used to apply to IMO portable tanks and road tank vehicles.

- **Column 13 – UN Tank and Bulk Container Instructions**
- Contains T codes (see 4.2.5.2.6) applicable to the transport of dangerous goods in portable tanks and road tank vehicles**.**

IBC - Intermediate bulk containers - designed to store products in large quantities, providing a safe and durable way to move them around.

- **Column 14 – Tank Special Provisions**
- Contains TP notes (see 4.2.5.3) applicable to the transport of dangerous goods in portable tanks and road road tank vehicles.

- **Column 15 – EmS**
- Refers to the relevant emergency schedules for FIRE and SPILLAGE in 'The EmS Guide – Emergency Response Procedures for Ships Carrying Dangerous Goods'.

- **Column 16 – Stowage and Segregation**
- Contains the stowage and segregation provisions as prescribed in part 7.

- **Column 17 – Properties and Observations**
- Contains properties and observations on the dangerous goods listed.

- **Column 18 – UN Number**
- Contains the United Nations Number for ease of reference across both pages of the printed book.

Classification of Hazardous Cargo

The 9 classes:

Class 1	Explosives
Class 2	Gases
Class 3	Flammable liquids
Class 4	Flammable solids
Class 5	Oxidizing substances and organic peroxides
Class 6	Toxic and infectious substances
Class 7	Radioactive material
Class 8	Corrosive substances
Class 9	Miscellaneous dangerous substances and articles

These 9 hazard classes have been established internationally by a United Nations (UN) committee to ensure that all modes of transport (road, rail, air and sea) classify dangerous goods in the same way.

Dangerous goods are **classified into 9 classes** according to properties. The way in which different classes of dangerous goods are handled in transport will depend upon these properties and hazards, for example:

- The type of packaging that can be used.
- What classes of dangerous goods can be transported together in freight containers.
- Where the goods can be stored within the port and on board of the ship.

The purpose of the IMDG Code's classification system is:

- **To distinguish between goods** which are considered to be dangerous for transport and those which are not.

- **To identify the dangers** which are presented by dangerous goods in transport.

- **To ensure that the correct measure are taken** to enable these goods to be transported safely without risk to persons or property.

The supplement contains the following texts related to the Code:

- Emergency Response Procedures for Ships Carrying Dangerous Goods
- Medical First Aid Guide
- Reporting Procedures
- IMO/ILO/ECE Guidelines for Packing Cargo Transport Units
- Safe Use of Pesticides in Ships, Cargo Holds and Containers
- International Code for the Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships

ECE – Economic Commission of Europe

How you should search the DG good?

1. By using the PSN.
2. By using the UN number

In case you do not have the UN Number but have the PSN, you can find its associated UN Number by looking at the alphabetical index at the back of Volume 2 of IMDG Code.

PSN and UN Number – For Identification of DG cargo

Within each of the 9 hazard classes dangerous goods are uniquely identified by two pieces of information:

- A four-digit number known as the UN Number which is preceded by the letters UN.

- The corresponding Proper Shipping Name (PSN) – This is the standard technical name to describe the hazard properties and the composition of dangerous goods.

For example, kerosene is identified in the IMDG Code by its UN Number UN 1223 and the PSN Kerosene.

PSN – Proper Shipping Name

The Importance of PSN and UN Number

Together the UN Number and PSN uniquely identify dangerous goods to:

- enable rapid and precise identification during transport to ensure the correct handling, stowage, segregation etc., and

- in the event of an emergency, ensure that the correct procedures are followed.

Let's take a few other examples of PSNs:-

Caustic Soda – Sodium Hydroxide
Baking Powder – Sodium Bicarbonate
Bleaching Powder – Sodium Hypoclorus

Class 1 - Explosives

This includes items such as:

- explosive substances
- pyrotechnic devices
- ammunition
- fireworks
- detonators.

Class 2 - Gases

These can be transported as:

- compressed
- liquefied
- refrigerated liquefied
- gas in solution.

Class 2 has 3 divisions:

Division 2.1 - flammable gases such as:

- butane
- propane

Division 2.2 - non-flammable, non-toxic gases such as:

- oxygen
- liquid nitrogen / refrigerants
- compressed air

Division 2.3 - toxic gases such as:

- chlorine
- hydrogen sulphide
- carbon monoxide

Class 3 - Flammable liquids

This includes liquids with a boiling point of 35^{o} C or less, or a flash point of 60^{o} C or less such as:

- petrol
- alcohol
- perfumes
- essential oils
- hand sanitizer
- paints.

- **Flash point** - The lowest temperature at which a liquid or solid produces enough vapor to form a flammable air-vapor mixture near its surface so that it can be ignited by a spark or flame at atmospheric pressure.

- **Boiling point** - The temperature at which the material changes from liquid to gas.

Liquid	Flashpoint (° F)	Boiling Point (° F)	Category
Diesel Fuel #2	126	320	3
Toluene	40	231	2
Motor Oil	392	599	N/A
Isoamyl Acetate	77	288	3
Ethyl Ether	- 49	94	1

Class 4 - Flammable Solids

These are substances that can spontaneously combust and substances, that when they come into contact with water or emit flammable gases. Class 4 has 3 divisions:

Division 4.1 - flammable solids such as:

- hexamine solid fuel tablets for camping stoves
- self-reactive substances
- desensitized explosives

Division 4.2 - substances that can spontaneously combust under normal air transport conditions include:

- camphor
- Sulphur
- matches

Division 4.3 - substances that emit flammable gases when they come into contact with water include:

- sodium
- zinc particles
- activated carbon.

Class 5 - Oxidizing substances and organic peroxides

These substances are not necessarily combustible on their own but can react dangerously with other substances. Class 5 has 2 divisions:

Division 5.1 - oxidizing substances that may not be necessarily combustible, but they may readily yield oxygen and cause other materials to combust, such as:

- hydrogen peroxide
- ammonium nitrate
- potassium chlorate
- sodium nitrate
- Calcium Hypochlorite

Division 5.2 - organic peroxides are thermally unstable and can emit heat and give off harmful or flammable vapours. They can also be liable to explosive decomposition and react dangerously with other substances. Examples are:

- acetyl acetone peroxide
- benzoyl peroxide
- peracetic acid.

Class 6 Toxic and infectious substances

These substances can cause sickness, injury or death if consumed. Class 6 has 2 divisions:

Division 6.1 - toxic substances that can cause death, injury or to harm human health if swallowed, inhaled or by skin contact, such as:

- chloroform
- arsenics
- cyanides
- cytotoxic waste
- barium compounds
- Pesticides, Arsenic and Tear Gas.

Division 6.2 - infectious substances that contain or are expected to contain pathogens that can cause disease in humans or animals, including:

- medical or clinical waste
- patient specimens
- genetically modified organisms
- infectious substances
- infected animals.

Class 7 Radioactive materials

These are substances that emit invisible ionizing radiation that can be harmful to humans and animals. It can cause objects such as aircraft and equipment to become contaminated if not packaged and handled correctly, such as:

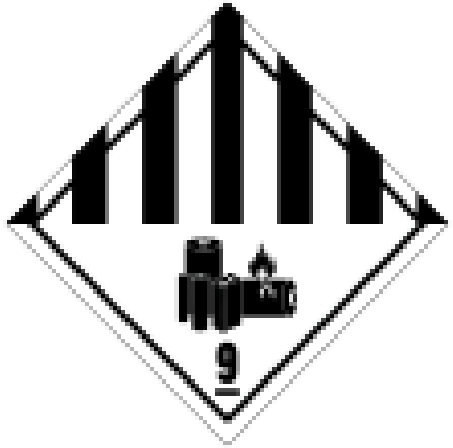
- uranium
- radioactive ores
- isotypes
- radium
- cesium
- x-ray equipment
- medical equipment or parts.

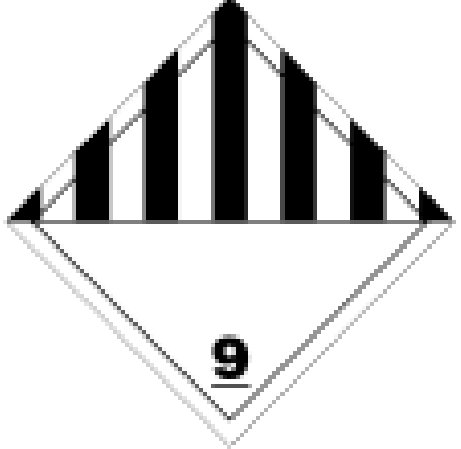
Class 8 - Corrosives

These substances can cause irreversible damage if they come into contact with skin and could destroy other freight, or materially damage containers or aircraft. This includes:

- acids
- corrosive cleaners
- battery fluid
- formaldehyde
- hydrofluoric acid
- Sulfuric Acid

Class 9 - Miscellaneous





- These are substances and articles which, during air transport, present a danger not covered by other classes. There are 2 types of handling labels – 1 for lithium battery shipments, and another for all other miscellaneous dangerous goods. This class includes:
- lithium batteries
- battery powered vehicles
- battery powered equipment
- first aid kids
- environmentally hazardous substances
- dry ice
- magnetized materials
- asbestos.

Hazard labels

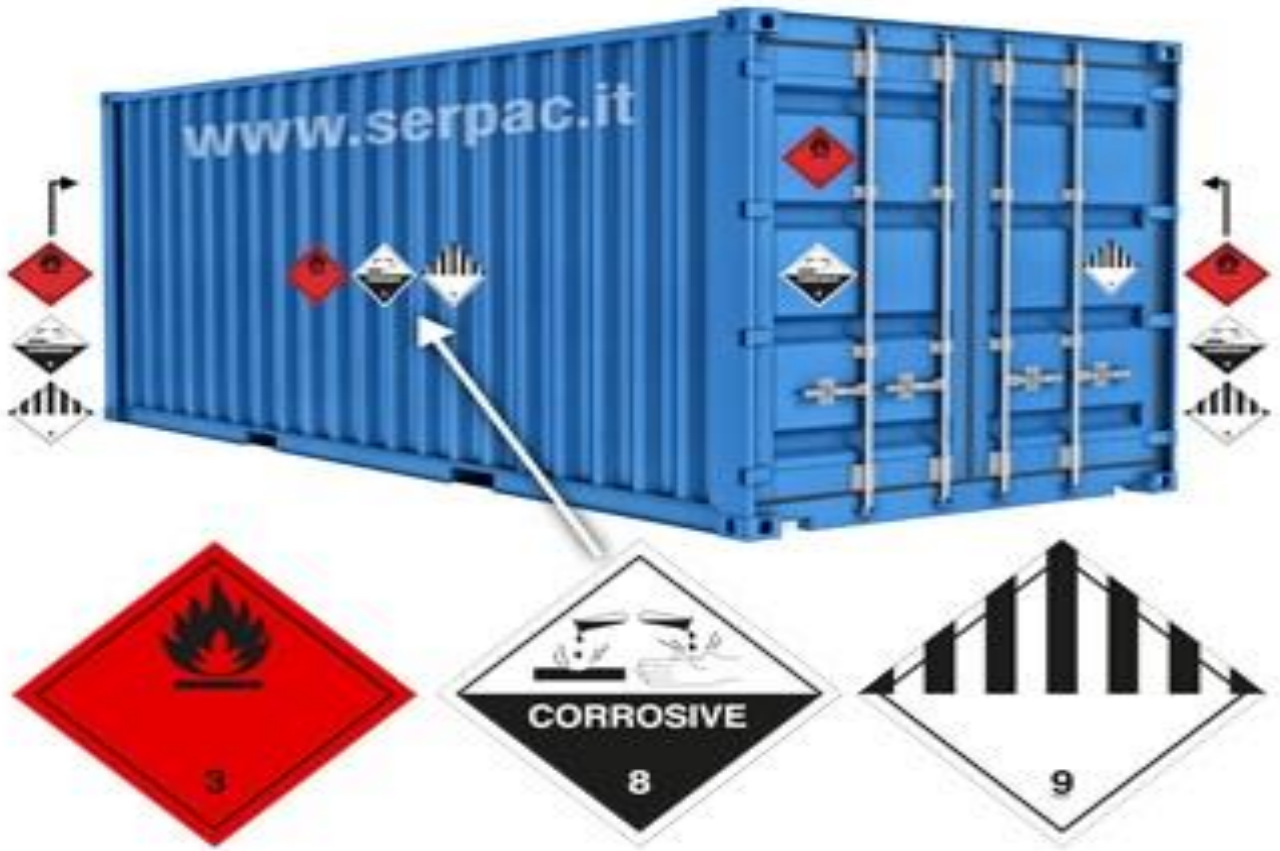
UN CLASS	GOODS	DIVISION	EXAMPLES
Class 1	Explosives		Gunpowder, TNT
Class 2	Gases	**2.1** Flammable gases **2.2** Non-flammable, non-toxic gases **2.3** Toxic gases	Acetylene, aerosols Helium, oxygen Chlorine
Class 3	Flammable liquids		Kerosene, acetone
Class 4	Flammable solids	**4.1** Flammable solids **4.2** Spontaneously combustible substances **4.3** Substances that emit flammable gases when in contact with water	Red phosphorus Phosphorus Sodium
Class 5	Oxidising substances	**5.1** Oxidising agents **5.2** Organic peroxides	Ammonium dichromate Ethyl methyl ketone peroxide
Class 6	Toxic substances	**6.1** Toxic substances **6.2** Infectious substances	Cyanide, arsenic Vaccines
Class 7	Radioactive material		Uranium oxide
Class 8	Corrosive substances		Hydrochloric acid, batteries with acid
Class 9	Miscellaneous dangerous goods		Dry ice, asbestos

CLASS 1 **EXPLOSIVES**		Explosives: materials that can detonate and explode, for example, gelignite, dynamite, nitropil, various detonators, ammunition and fireworks.
CLASS 2.1 **Flammable gases**		Flammable gases: gases that can ignite in air or on contact with an ignition source, for example LGP and acetylene.
CLASS 2.2 **Non Flammable Non toxic Gases**		Non Flammable Non toxic Gases: gases that can displace atmospheric oxygen causing asphyxiation. These materials are often storedunder pressure causing an additional hazard. Examples include nitrogen, carbon dioxide and oxygen.
CLASS 2.3 **Toxic Gasses**		Toxic Gasses: gases that are liable to cause death if inhales, for example, chlorine gas and anhydrous ammonia.
CLASS 3 **Flammable Liquids**		Flammable Liquids: liquids thar produce vapours that can ignite in air on contact with an ignition source. Examples include: petrol, benzene, acetone, MEK and kerosene.
CLASS 4.1 **Flammable Solids**		Flammable Solids: solid materials that can give off enough vapours for ignition to occur. Examples include: sulphur, carbon and red phosphorous.
CLASS 4.2 **Spontaneously Combustible**		Spontaneously Combustible: materials that can emit flammable or toxic gases if contacted by water. For example sodium, zinc dust, calcium carbide and zinc.
CLASS 4.3 **Dangerous When Wet**		Dangerous When Wet: materials that emit flammable or toxic gases if contacted by water. For example: sodium, zinc dust, calcium carbide and zinc phosphate.
CLASS 5.1 **Oxidising Agents**		Oxidising Agents: materials that can release oxygen and increase the intensity and burning rate of a fire. Examples include sodium nitrate, potassium chlorate, ammonium nitrate and calcium hypochlorite.
CLASS 5.2 **Organic Peroxides**		Organic Peroxides: materials that have the ability to provide both fuel and oxygen if involved in a fire. These materials are generally unstable and need to be stored under refrigeration. Examples include: methyl ethyl ketone peroxide, and various fiberglass hardeners.
CLASS 6.1 **Toxic Substances**		Toxic Substances: materials that can cause death or injury when swallowed, inhaled or brought into contact with skin. An example of this cyanide.
CLASS 6.2 **Infectious Substances**		Infectious Substances: examples of these materials generally include viruses, bacteria and other pathogens plus various items of material waste.
CLASS 7 **Radioactive Materials**		Radioactive Materials: materials that emit ionizing radiation, whick can effect the body's cells and disrupt other metabolic processes. Examples include uranium, plutonium and strontium.
CLASS 8 **Corrosive Substances**		Corrosive Substances: materials that can cause serious damage on contact with the skin or damage the airway if vapours are breathed in. Examples include hydrochloric acid, sulphuric acid, nitric acid and caustic soda.
CLASS 9 **Miscellaneous Dangerous Goods**		Miscellaneous Dangerous Goods: materials that present a hazard nor covered by any of the above classes. The danger associated with the material is usually unique to that substance. Examples include dry ice, asbestos, hot bitumen and molten aluminum.

SEGREGATION OF PACKAGES OF HAZARDOUS SUBSTANCES

IF YOU HAVE:	DO NOT LOAD OR STORE WITH:	SEPARATE BY 1 METRE FROM:
Class 1 EXPLOSIVE	*	
Class 2.1 FLAMMABLE GAS		
Class 2.2 NON-FLAMMABLE GAS		
Class 2.3 POISON GAS	Food or food containers	
Class 3 FLAMMABLE LIQUID		Food or food containers
Class 4.1 FLAMMABLE SOLID		
Class 4.2 SPONTANEOUSLY COMBUSTIBLE		
Class 4.3 DANGEROUS WHEN WET		
Class 5(a) (Class 5.1) OXIDIZING AGENT		Food or food containers
Class 5(b) (Class 5.2) ORGANIC PEROXIDE		Food or food containers
Class 6.1 POISON #	Food or food containers	
Class 6.1 HARMFUL #	Food or food containers	
Class 6.2 INFECTIOUS SUBSTANCE	Food or food containers	
Class 7 RADIOACTIVE		
Class 8 CORROSIVE #	Food or food containers	

Ensure acids and alkalis are not loaded or stored together



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Container transporting dangerous goods with different UN numbers or goods with a subsidiary risk.
In this example dangerous goods of class 3,8 and 9. **Flammable liquids, Corrosive & Miscellaneous**

Is this a DC container?

What are the commodity classes?

Pre-requisites when Packing of Dangerous Goods in Containers

- The container/vehicle should clean, dry and apparently fit to receive the goods.
- Incompatible goods should not load into the same container/vehicle.
- All packages should be intact and must externally inspect for any damages.
- Drums or Cans should load in an upright position.

Pre-requisites when Packing of Dangerous Goods in Containers – Continued….

- All packages should properly pack and secure in the container.

- All packages should evenly distributed in the container.

- The packages and the container should properly mark, label and place. Any irrelevant mark, labels should remove from the container.

A poorly packed container exposes transport workers and ship staff to risk. Also, they pose risk to other cargo, equipment and environment.

If IMDG code is neglected or ignored in Maritime Transport?

This why we need to make use of IMDG codes

For Safety..!


APL
APL
NOL
APL
MOL
APL
APL
APL

General Average – What does it mean?

This is a principle of maritime law that essentially establishes that all sea cargo stakeholders (owner, shipper, P&I etc.) evenly share any damage or losses that may occur as a result of voluntary sacrifice of part of the vessel or cargo to save the whole in an emergency.

What is an example of a general average?

A classic example of a General Average sacrifice is jettison to lighten a stranded vessel. Jettison is the throwing overboard of cargo or ship's material, equipment or stores. Other examples include stranding, fires, and collisions.

General Average in marine insurance means, literally, a general loss.

When General Average is declared, not only are ocean carriers not liable for loss or damage to cargo, but every cargo owner is actually responsible, in part, for the cargo of others, as well as the ship itself.

20 May 2021, M/V Xpress Pearl was showing fumes from leaking nitric acid

X-Press Pearl – Brief Story

She carried 1,486 containers, with contents including 25 tons of nitric acid (which can be used in the manufacture of fertilizers and explosives), other chemicals, cosmetics and low-density polyethylene (LDPE) pellets. When it departed the port of Hazira on 15 May 2021, arriving off Colombo on 19 May.

By 11th May the crew had discovered that a container loaded at Jebel Ali was leaking nitric acid, and had requested both Hamad and Hazira ports to allow it to be offloaded, but permission was not granted. According to X-Press Feeders, the requests were denied as "there were no specialist facilities or expertise immediately available to deal with the leaking acid", and the vessel proceeded on its planned journey to Colombo.

Crawford & Co. estimated that the cargo loss of the X-Press Pearl could range between $30 million and $50 million in addition to the loss of the vessel.

Nitric Acid – This is an oxidizer & corrosive pale yellow to reddish brown liquid generating red-brown fumes and having a suffocating odor. This may react violently or cause fires with COMBUSTIBLES; ORGANICS (such as TURPENTINE, CHARCOAL and other CARBON CONTAINING COMPOUNDS such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE.

X-Press Pearl – Brief Story

Compensation paid by P&I Club so far:-

So far Government has received Rs.720 million as a part of the first interim payment , out of which Rs. 420 million has been allocated to pay compensation for our fishermen.

Petition seeking an order to set up a Marine Environment Conversation Fund:-

This has been sought for the environmental degradation due to the pollution caused by the vessel.


DW
MV Express Pearl Ship
now sinking

A charred shipping container, one of more than 1,400 onboard the X-Press Pearl, is hauled off a beach in western Sri Lanka. Containers have surfaced up to 100km away from where the ship sank. Photo: Sri Lanka Marine Environment Protection Authority

Crews collect lentil-sized plastic pellets from a Sri Lankan beach. By one estimate, the X-Press Pearl was carrying some 75 billion of these pellets when it sank off the coast of Colombo. Photo: Shutterstock/Ruwan Walpola

The tiny size of the plastic pellets means that some must be collected and hand sieved a laborious process. So far, Sri Lanka has filled 53,000 garbage bags with pellets, sand and other debris. Photo: Sri Lanka Marine Environment Protection Authority

Local fishers have found plastic pellets in gills and guts of fish, though researchers are still determining if the plastic is responsible for fish deaths. Photo: Sri Lanka Marine Environment Protection Authority

A toxic brew

Experts are worried that chemicals from the X-Press Pearl may have scalded sea life. Sri Lankan officials have found turtle carcases with what they suspect could be burn marks, though research continues. Photo: UNEP

Sri Lanka Ships Containers of Illegal, Hazardous Waste Back to the U.K.

In a literal about-turn, up to 260 tons of toxic waste — containing used mattresses, rugs, and carpets, but also hospital waste sent to Sri Lanka by the United Kingdom, is making its way back to the West after Sri Lankan authorities found the shipment in violation of international law. The illegal, hazardous waste first arrived in Colombo between September 2017 and March 2018 in 263 containers,

Handling of Hazardous Cargo

Handling of Hazardous Cargo

- Important Steps to Follow – Preparation
- Deceleration of IMDG cargo for sea carriage
- Approval Process prior to shipping
- Booking Note – Cargo declaration request to the carrier
- Parties involved for Carriage & Clearance

What are the Important Steps to follow when Shipping DG by Sea? - Preparation

- **Know the cargo groups -** IMDG cargoes are divided into three main groups and each has a specific plan to store, transport and handling in case of accident or spill:

  Group 1: Cargo which are extremely dangerous

  Group 2: Cargo with moderate danger

  Group 3: Cargo with less danger

- **Classify dangerous Goods**. First **step** is to classify the **goods** under the criteria of IMDG Code. (A mistake made in classification may change the packing group or proper shipping name or even a wrong class which can cause wrong stowage on board ships and wrong application of emergency response thus endangering lives at sea).

- **Pack dangerous goods**. Options of packaging are listed through Packing, IBC and Tank **instructions**. (IBC - Intermediate Bulk Container is a pallet mounted, industrial grade reusable container that is used for storing and transporting bulk liquids and powders)

- **Mark, label or placard dangerous goods**.

- **Load/ Unload Cargo Transport** Unit. (Most of the cargo damages and fires are originated by dangerous goods poorly packed in containers.)

- **Prepare Transport** Document.


Classify Dangerous Goods
Pack Dangerous Goods
Mark, label or placard Dangerous Goods
Load/ Unload Cargo Transport Unit
Prepare Transport Document

Below are the legal declarations of Shipper and Packer of dangerous goods when in need of approvals & permission from authorities

- **SHIPPER'S DECLARATION**

I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labelled/placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.

- **CONTAINER/VEHICLE PACKING CERTIFICATE**

I hereby declare that the goods described above have been packed/ loaded into the container/vehicle identified above in accordance with the applicable provisions.

Personnel involved in preparing transport documents for dangerous goods would be:

Consignor/Shipper/FWDR	- Shipping document
Carrier/Agent	- DG Manifest
Trucker/FWDR	- Container/vehicle packing certificate
Consignor/Shipper/FWDR/Authorities	- Competent authorities' approval
Consignor/Shipper/FWDR/CEA	- Waste transport documentation
Consignor/Shipper/FWDR/Lab/Authorities	- Special documentation such as MSDS, Quarantine, where appropriate

Summary of the hazardous cargo application and approval process for Exports

- haz cargo request sent to shipping line – Booking Note
- shipping line verifies the details provided
- shipping line checks haz space on the vessel
- shipping line confirms acceptance
- client packs the container and affixes the correct haz labels
- haz documentation is passed and container goes into the port/terminal
- client fills up the haz packing declaration and gives a copy to the shipping line
- shipping line provides the haz packing declaration to the ship and the port terminal along with haz cargo manifest

Hazardous Cargo Request to the Carrier

A Dangerous Goods Declaration is the only document that contains all the information relating to the goods in terms of

- Vessel/Voyage
- Port of destination or Place of Delivery
- Description of cargo (Weight & Measurement)
- Quantity of Dangerous Goods
- UN No.
- Hazard Class (IMO Class #)
- **Proper shipping name(PSN) and the technical name**
- Packaging Group (1, 2 or 3)
- Type and make of packaging
- The container number in which these dangerous goods are packed

Approval process for hazardous cargo - Imports

Importer - Must obtain prior approval/permission from MOD before placing the order.

Carrier/Clearing Agent - Must obtain approval/Permission from MOD for local imports as well as for cargo in-transit via Port of Colombo

Following documents to be submitted for such approval.

- Name of the vessel
- ETA
- POL / POD
- PSN / SLPA Page Group / IMO Page Group
- Quantity in weight & Measurement
- Container Number/s
- Copy of the Bill of Lading
- Weather the cargo is for in-transit/Transhipment/Local discharge

At the time of approval of DGR, the carrier invariably requests for an MSDS = **M**aterial **S**afety **D**ata **S**heet.

What information MSDS contains?

- the physical and chemical properties of the cargo like the three main points such as flash, boiling and melting points
- the nature of the cargo indicating its toxicity
- effects on one's health
- the first aid that needs to be administered in case of adverse contact
- possible reactions
- methods of storage
- methods of disposal
- protective equipment to be used by people that come in contact with the material
- spill-handling procedures

Material Safety Data Sheet (MSDS)

- Also known as PSDS (Product safety data sheet)
- A form with data regarding the properties of a particular substance.
- provide workers and emergency personnel with procedures for handling or working with that substance in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.
- MSDS formats can vary from source to source within a country depending on national requirements.
- can be found anywhere where chemicals are being used.
- In some jurisdictions the MSDS is becoming MANDATORY to state the chemical's risks, safety, and effect on the environment.

MATERIAL SAFETY DATA SHEET

According to REACH-directive 1907/2006

PRODUCT NAME: XXX

1. IDENTIFICATION OF THE SUBSTANCE OR PREPARATION AND THE COMPANY

Product label name: Ethylenediaminetetraacetic, tetrasodium salt
Supplier: XXX
Address: XXX
Telephone number: 1234567890
Emergency telephone: 1234567890 (Fax: 1234567890)
Intended use: chelating agent

2. HAZARDS IDENTIFICATION

Harmful if swallowed. Irritating to eyes and skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is to be considered as a substance in conformance to EC directives.

Information on hazardous ingredients:
Chemical description: Ethylenediaminetetraacetic, tetrasodium salt
Composition / information on ingredients

Chemical name	CAS-no.	% w/w	Symbol(s)	Risk-phrase(s)
Ethylenediaminetetraacetic tetrasodium salt	64-02-8	min. 86	Xn[9], R22, R36	Harmful if swallowed Irritating to eyes
Sodium hydroxide	1310-73-2	0.5-2	C[10] , R35	Causes severe burns

4. FIRST AID MEASURES

Symptoms and effects: No typical and effects known.

First aid:

General: In all cases of doubt, or when symptoms persist, seek medical attention.

Inhalation: Dust may be irritating to the respiratory tract and cause symptoms or bronchitis. Move to fresh air. If symptoms persist, seek medical advice.

Skin: Take off contaminated clothing immediately. Wash immediately with soap and water. Launder clothes before reuse.

Eyes: Rinse thoroughly with plenty of water. Eyelids should be held away from the eyeball to ensure thorough rinsing. Seek medical advice.

Ingestion: Rinse mouth, give water to drink. Do NOT induce vomiting. Seek medical advice after significant exposure.

Advice to physician: No additional information available

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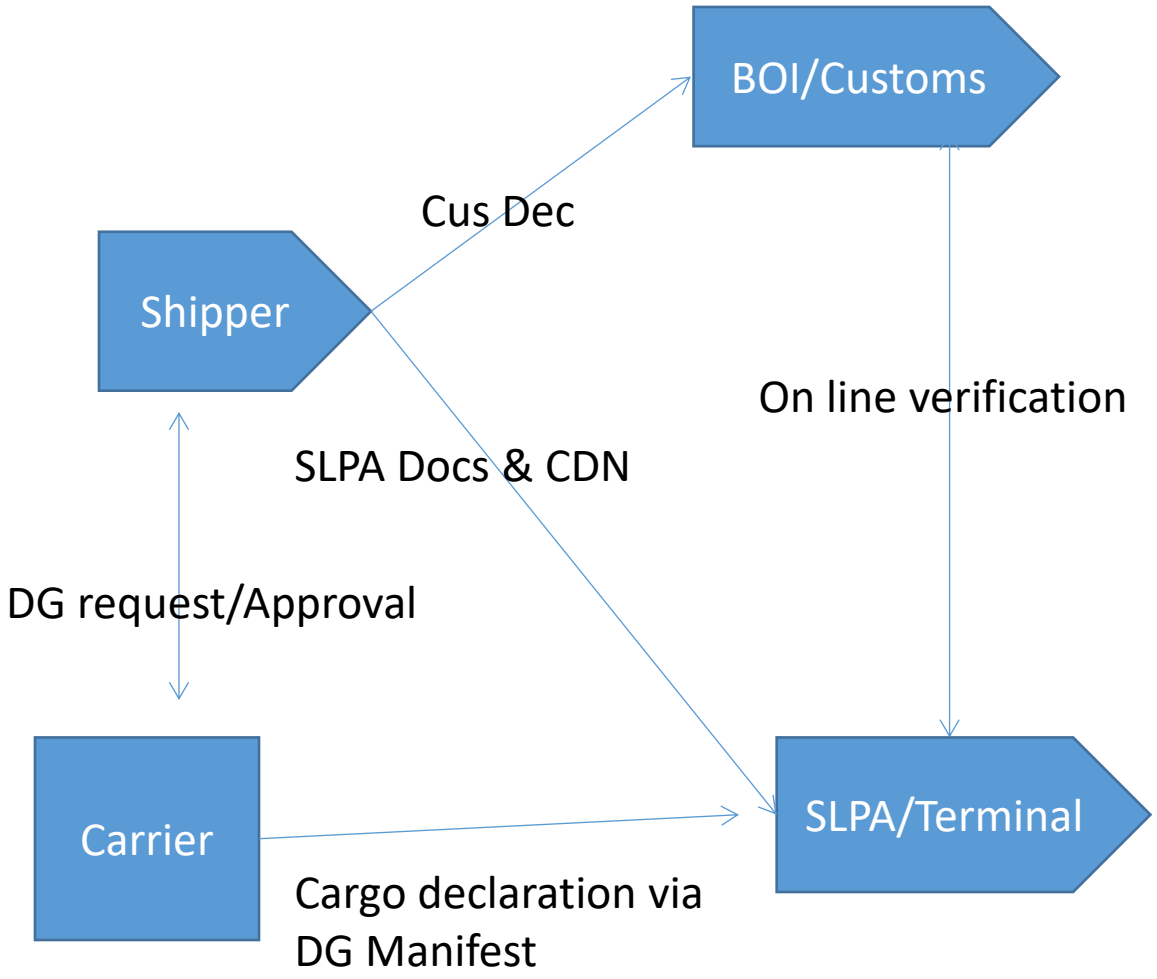
[9] Harmful
[10] Corrosive

Parties involved in export Clearance of IMDG cargo



Responsibilities vested with the parties involved

Shipper - DG request form & completed DG declaration upon packing done

Carrier - Review DG request & Approve

BOI / Customs – Follow IMO regulations for ratification
- Complying with Carrier acceptance approval
- Levy a fee (if applicable) as per Ordinance

TERMINAL / SLPA – Levy a fee (IMO charge) as per port tariff
- Directives to terminal for stacking

Why the proper declaration of Hazardous Cargo is required?

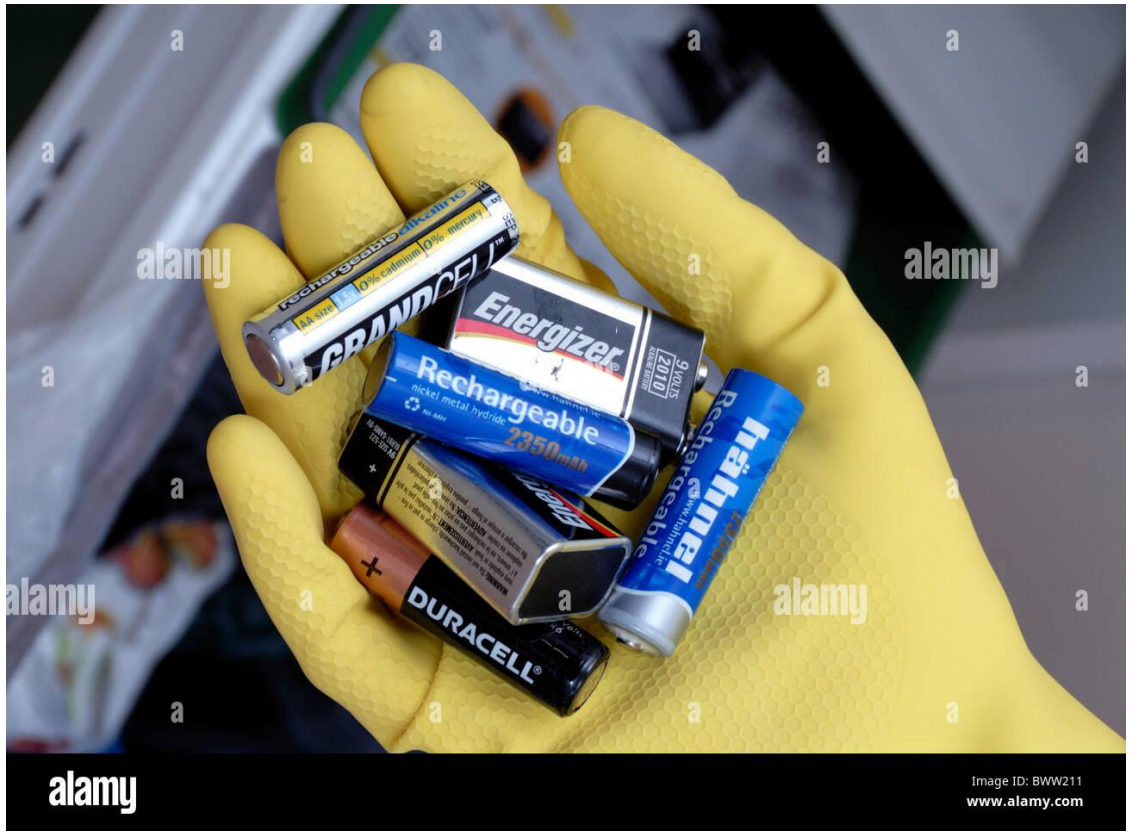
Points to ponder:-

It is necessary for the shipping line to check for acceptance of the hazardous goods at transshipment or ports that the vessel calls because some ports do not allow ships carrying high risk cargoes like Class 1 or Class 7 to enter their ports or enter without taking safety precautions.

Imagine the consequences if this was not checked and a particular calling port along the liner route does not allow the ship to enter because of the presence of these hazardous goods on board.

This haz packing declaration is a **VERY VERY IMPORTANT** document for the ship, the shipping line, the client, the transporter, the ports, as it details all the information relating to the hazardous product being carried.

After all, SAFETY FIRST – you see this on all ships..



Carriage of Hazardous Cargo by Air

What are dangerous goods in IATA?

Dangerous Goods are items that may endanger the safety of an aircraft or persons on board the aircraft. Dangerous Goods are also known as restricted articles, hazardous materials and dangerous cargo.

Following are some examples of Dangerous Goods sent by Air

Aerosols,

Lithium batteries,

Infectious substances,

Fireworks,

Dry-ice,

Gasoline powered engines and machinery,

Lighters, and paint.

Some items that passengers carry are classified as dangerous goods, such as mobile phones, lighters, tablets and laptops, which have a lithium ion battery

What You Need To Know About The Transport Of Dangerous Goods By Air

With so many dangerous goods being shipped by air, safety regulations must be followed precisely.

IATA helps identify the risks and works with ICAO (International Civil Aviation Organization) to amend the regulations providing stakeholders with the most current guidelines on how to handle and ship dangerous goods safely.

What are Dangerous Goods

It's important to know what a dangerous good is before you ship. According to IATA's Dangerous Goods Regulations (DGR) Manual, "Dangerous goods (also known as hazardous materials or hazmat) are articles or substances which are capable of posing a hazard to health, safety, property or the environment and which are shown in the list of dangerous goods in the IATA Dangerous Goods Regulations or which are classified according to those Regulations." Because IATA participates in strict regulatory process, dangerous goods can be transported by air safely and securely when these guidelines are closely followed.

ICAO - International Civil Aviation Organization

IATA - International Air Transport Association

What dangerous goods Cannot be transported by air?

Flammable solids
Adhesives,
Articles containing celluloid,
Oily rags and petrol.
Oxidizing substances and organic peroxides
Bleaches,
Acids and pool chemicals,
Glass fibre repair kits,
Hair and textile dyes,
Disinfectants and adhesives.

Important guidelines to handle below DG cargo by Air

- **Infectious Substances**

As the shipping of infectious substances, including specimens being shipped for diagnostics purposes is typically limited to people involved in the healthcare industry, including the veterinary sector, IATA has created the Infectious Substances Shipping Guidelines (ISSG). It is a comprehensive shipper focused guide that helps shippers, safely meet the regulations necessary to ship infectious substances and patient specimens.

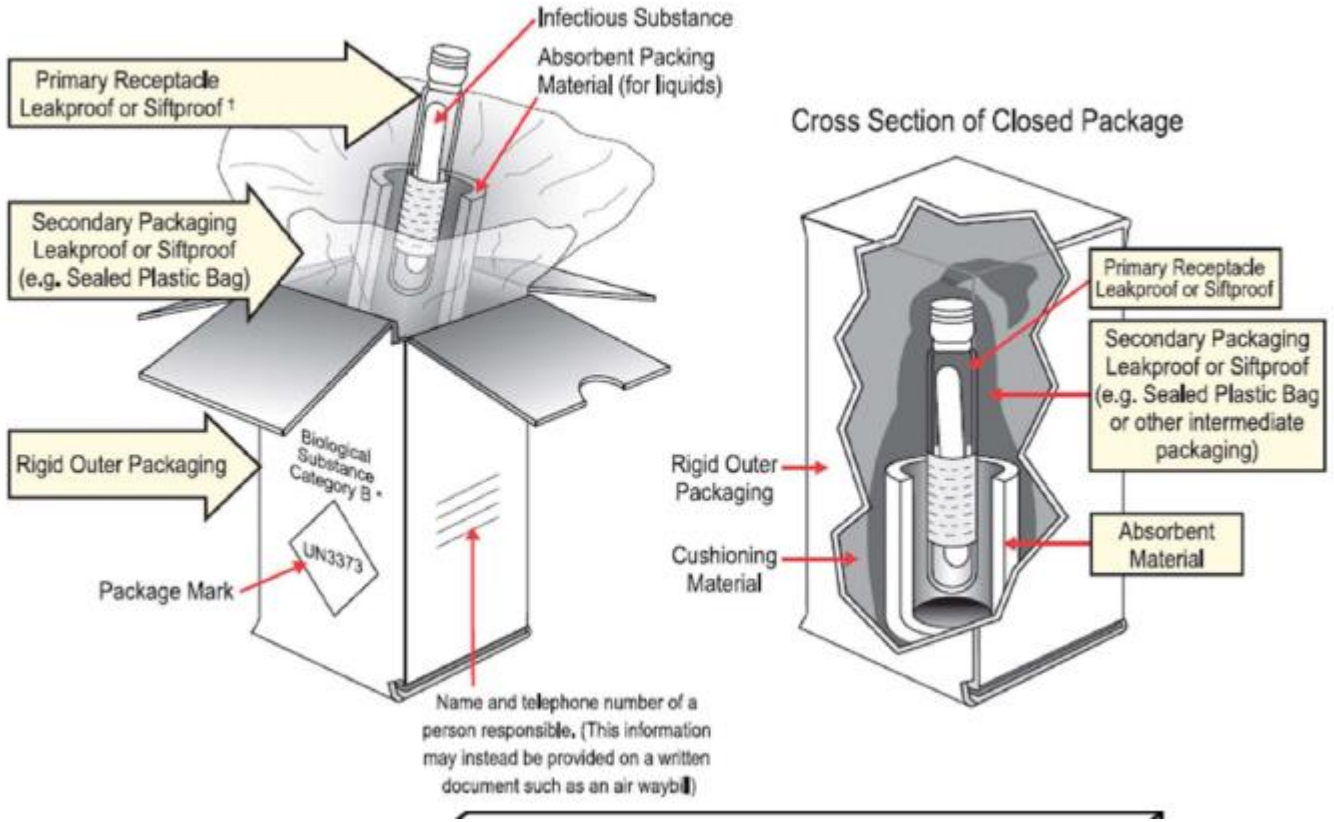
- **Lithium Batteries**

Lithium batteries are one of the most commonly transported dangerous goods. The rules and regulations regarding the transport of lithium batteries need to be addressed specifically, so IATA created a unique manual geared specifically to shippers of lithium batteries.

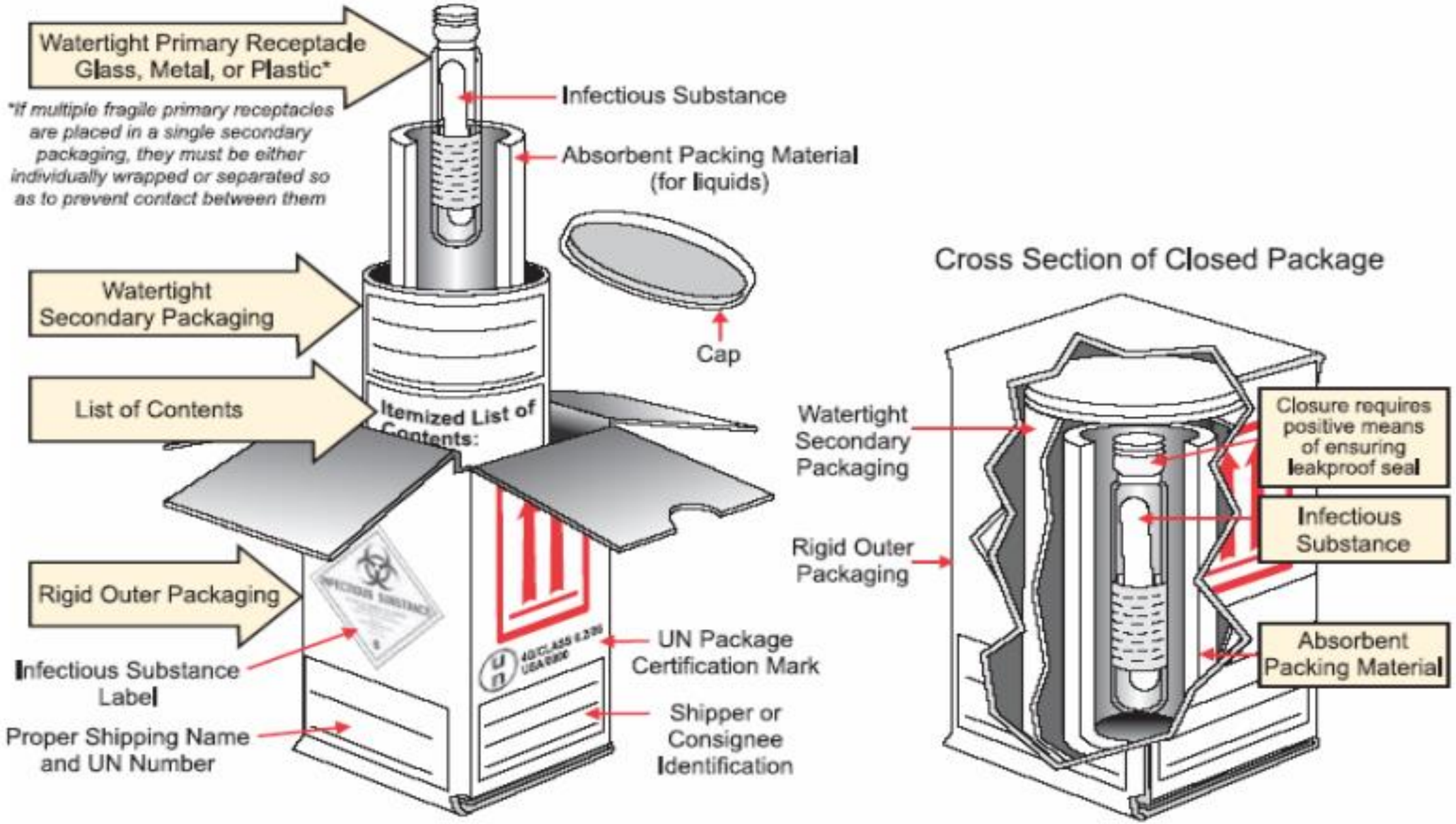
This manual further breaks down how to safely transport lithium batteries for companies and individuals who may not be familiar with the dangerous goods process. The IATA Lithium Battery Shipping Regulations (LBSR) can better assist with the regulations for shipping lithium batteries and items that contain lithium batteries.

What is the IATA packing instruction for infectious substance Category A?

Category A infectious substances must be tripled packaged and compliant with IATA Packing Instruction 602 diagrammed below.



The maximum quantity of Category A infectious substance that can be shipped by air in one package is 4 L or 4 kg. The maximum allowable quantity on passenger aircraft is 50 ml or 50 g.


Watertight Primary Receptacle
Glass, Metal, or Plastic*
*If multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated so as to prevent contact between them
Infectious Substance
Absorbent Packing Material
(for liquids)
Watertight
Secondary Packaging
Cap
List of Contents
Itemized List of Contents:
Rigid Outer Packaging
Infectious Substance
Label
UN Package
Certification Mark
Proper Shipping Name
and UN Number
Shipper or
Consignee
Identification
Cross Section of Closed Package
Watertight
Secondary
Packaging
Rigid Outer
Packaging
Closure requires positive means of ensuring leakproof seal
Infectious
Substance
Absorbent
Packing Material

Why does lithium explode in air?

As the heat of the fire increases, a process called thermal runaway can begin. This is where the heat generated inside the battery begins to exceed the amount that is dispersed elsewhere, potentially resulting in an explosion from the battery.

A lithium-ion battery fire or explosion can turn your flight into a death trap within minutes. That's why air travel authorities have established some strict guidelines about traveling with lithium-ion batteries.

Can you pack lithium batteries in checked luggage?

Checked Bags: **No**

Spare (uninstalled) lithium ion and lithium metal batteries, including power banks and cell phone battery charging cases, must be carried in **carry-on baggage only**.In other words – your cabin bag.

Has a lithium battery ever caused a plane crash?

2006: Destruction of UPS plane in Philadelphia caused by ignition of Li-Ion batteries, resulting in the death of two crewmembers. Besides the intense fire and toxic fumes, thick smoke inside the cockpit was reported.

2010: Two fatalities when a cargo plane crashed shortly after take off in Dubai.

How do you pack lithium batteries for air travel?

When a carry-on bag is checked at the gate or at planeside, all spare lithium batteries and power banks must be removed from the bag and kept with the passenger in the aircraft cabin. The battery terminals must be protected from short circuit.

What is the UN packaging for lithium-ion batteries?

Lithium batteries are now effectively classified as Class 9 material – termed “miscellaneous dangerous goods”. The specific UN regulations covering the shipment of these batteries are as follows: UN 3090, Lithium metal batteries (shipped by themselves) UN 3480, Lithium ion batteries (shipped by themselves)

UN Identification Numbers Applicable to Lithium Battery Shipments

UN3480: Loose lithium ion batteries
UN3481: Lithium-ion batteries “packed with” or “contained in” equipment
UN3090: Loose Lithium metal batteries:
UN3091: Lithium metal batteries “packed with” or “contained in” equipment

Who Is Involved In The Transport Of Dangerous Goods And What Are Their Responsibilities

Proper training for all persons in the dangerous goods supply chain is vital to ensure that the hazards posed by dangerous goods are understood and everyone involved is competent to perform the functions for which they are responsible.

- While some functions require basic knowledge of the dangerous goods regulations, other functions need detailed information regarding the hazardous material regulations to carry out their duties.
- Regulations and adequate training are required for each job function. Including shippers and packers, freight forwarders, operators and ground handling agents as well as security screeners.
- Having everyone who may come in contact with dangerous goods adequately trained is imperative. This includes cabin crew members and passenger check-in agents.

Shippers And Operators Responsibilities

- Comply with specific packaging requirements
- Use only the packaging permitted per IATA’s Dangerous Good Regulations (DGR)
- Correctly assemble and secure packaging according to instructions
- Adhere to the proper quantity per package
- Ensure packaging exterior does not contain any contaminants
- Remove any previous marking of container that no longer apply
- Properly label each package
- Fill out Shipper's Declaration for Dangerous Goods correctly along with Air Waybill

The operators will ensure that the shippers meet all guidelines and process each package against the Dangerous Goods Checklist to prepare it for storage or loading.

How To Fill Out A Shipper’s Declaration for Dangerous Goods And Air Waybill

Along with the Shipper’s Declaration of Dangerous Goods the freight forwarder will fill out the Air Waybill. The required information for that is as follows:

Handling Information Statement, Mixed Shipment if applicable, if the shipper’s declaration is not required, then the UN or ID number, proper shipping name, number of packages, and the net quantity of packages must all be noted. The Air Waybill must also notate if dry ice is being used and should include excepted quantities of goods and any other special documentation.

The Latest Edition of IATA for DG cargo:-

The latest edition of IATA’s Dangerous Goods Regulations (DGR) is the 64th edition which is effective from January 1, 2023 to December 31, 2023.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

IATA

Shipper	Air Waybill No. Page of Pages Shipper's Reference No. (optional)
Consignee	

Two completed and signed copies of this Declaration must be handed to the operator.

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for:
(delete non-applicable)

PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY

Airport of Departure (optional):

Airport of Destination (optional):

Shipment type: *(delete non-applicable)*

NON-RADIOACTIVE	RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

UN Number or Identification Number, Proper Shipping Name, Class or Division (subsidiary hazard), Packing Group (if required) and all other required information.

Additional Handling Information

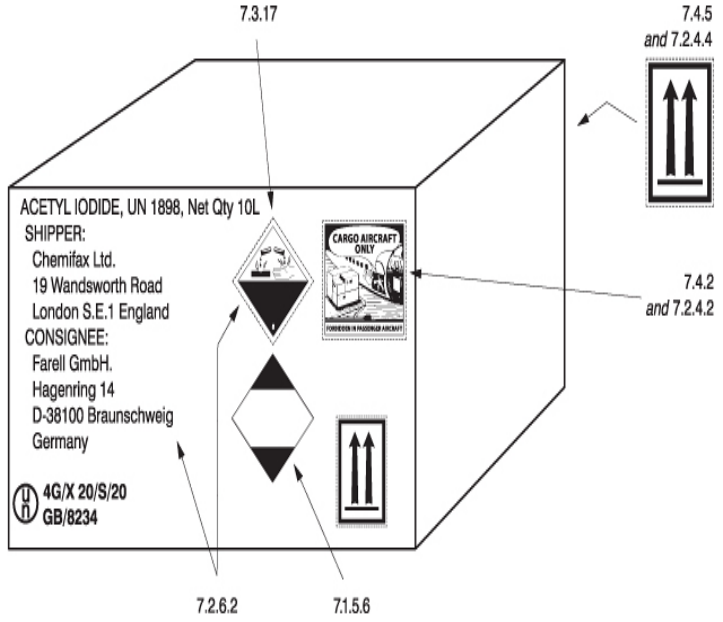
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.

Name of Signatory

Date

Signature
(See warning above)

Package Labelling Example (7.1.5.6)



Note:
The example shown above is of a package containing dangerous goods that meet all of the provisions for limited quantity in surface transport, but that for air transport are fully regulated, in this example, restricted to Cargo Aircraft Only.

The labels should be durable, printed on adhesive, adhered to the outside of the packaging, and clearly visible. They should meet all specifications, such as shape, color, format, symbol, and text. Every label must include an English version in addition to the language of origin.

Important points to ponder when Shipping & Handling Air Cargo

The Technical Instructions require that all dangerous goods be packaged and, in general, restrict the quantity per package according to the degree of hazard and the type of aircraft (i.e. passenger or cargo) to be used. There is generally no restriction on the number of packages per aircraft.

- Comply with specific packaging requirements.
- Use only the packaging permitted per IATA's Dangerous Good Regulations (DGR)
- Correctly assemble and secure packaging according to instructions.
- Adhere to the proper quantity per package.
- Ensure packaging exterior does not contain any contaminants.

Ground news regarding X-Press Pearl

X-Press Pearl was a Singapore-registered Super Eco 2700–class container ship having the capacity to carry 2,743 twenty-foot equivalent units. The vessel entered service in February 2021 and was around 186 meters (610 ft) long & operated by X-Press Feeders under SETMIL GROUP.

The ship was launched on 28 September 2020 and delivered on 10 February 2021.[12][13]

The vessel had made three voyages, calling at Colombo on 17 March and 18 April, and caught fire shortly after arriving for its third call at the port on 19 May.[14]

Just before she caught by the fire, she was carrying 1,486 containers, with contents including 25 tons of nitric acid (which can be used in the manufacture of fertilizers and explosives), other chemicals(No known yet), cosmetics and low-density polyethylene (LDPE) pellets.

Usage of Nitric Acid – Production of fertilizers / as an Explosives such as nitroglycerin and Trinitro-glycerin (TNT) / as an Adhesive / as a Medicinal / For Purifying Metals / Dye Intermediate /For Engraving /For drug Detection etc.

By 11 May the crew had discovered that a container loaded at Jebel Ali was leaking nitric acid, and had requested both Hamad and Hazira ports to allow it to be offloaded, but permission was not granted.[

According to X-Press Feeders, the requests were denied as "there were no specialist facilities or expertise immediately available to deal with the leaking acid“ at port of Hazira and the vessel proceeded on its planned journey to Colombo.

The ship reached Colombo on the night of 19 May and was anchored in the outer harbor awaiting a berth. The ship did not declare an emergency for the cargo acid leak.

On 20 May the ship's agents/SETMIL requested a re-working of the container. Harbour Master Nirmal de Silva said as a maritime hub, Colombo had the expertise to help. The vessel then issued its first report of a fire, which the crew had put out using its on-board Fire Extinguishers to control the situation.

Though initial reports linked the incident to leaking acid, Harbor Master De Silva said the fire had broken out in the number 2 hold of X-Press Pearl while the container was stacked on deck. A fuller investigation was needed to determine the cause.

A bit more about Nitric Acid (HNO3):-

Ideally this must store in glass containers that are secured, dry, cool in Temp <23'C/73.4'F, and should keep away from sources of ignition, combustible materials, other acids, bases, cyanides, and acetone.

Nitric acid is a highly acidic substance and a strong oxidizing agent. Its physical state is a colorless or slightly yellowish liquid. The chemical formula of nitric acid is HNO3 and it is made up of one hydrogen atom, one nitrogen atom, and three oxygen atoms.

The ship was carrying multiple classes of dangerous goods including **sodium hydroxide (caustic soda)** in holds as well as at least one container of nitric acid which was leaking on deck.

The voyage data recorder (VDR) or black box, was also recovered. On 16 June 2021, the chairman of local shipping agency, Arjuna Hettiarachchi representing X-Press Pearl ship who was identified as the main suspect regarding the incident was granted bail by the Colombo High Court.

On 31 October, A French source of research has published an investigation tracking the **nitric acid container** to Iran where it was allegedly sold by a broker company called ChemiPakhsh Paykan and produced by Esfahan Chemical Industries, a sanctioned affiliate of the Iranian Ministry of Defense.

Environmental effects:-

here are two immediate risks from the incident that need to be eliminated as soon as possible:

a Sudden major spill of the fuel oil aboard the ship;
b. Pollution and navigational hazards from the wreck and lost containers.


The devastated port of Beirut days after the August 4 explosion.

What really happened in the city of Beirut in Lebanon?

On August 4, a series of explosions at the port of Beirut, Lebanon, left 200 people dead, injured 5,000 and destroyed large parts of the city. The blasts were traced to 2,750 tons of **ammonium nitrate** stored unsafely in a warehouse stored reportedly for six years in a port warehouse.

The UN Recommendations on the Transport of Dangerous Goods classifies **ammonium nitrate** as an oxidizing agent and hence, hazardous. In India, it is listed as an explosive under the Explosives Act, 1884.

What is Ammonium nitrate, (NH4NO3) ?

It is a salt of ammonia and nitric acid, used widely in making artificial fertilizers and also explosives.

What could happen when Ammonium Nitrate get heated up over a period of time?

When it is heated, it decomposes exothermically into nitrous oxide and water. dissociates endothermically into ammonia and nitric acid vapor.

When nitric acid reacts with ammonia, it produces a white crystalline salt called ammonium nitrate (NH4NO3). This process could have continued over a period of six years in a port warehouse resulted in leading to this explosion.

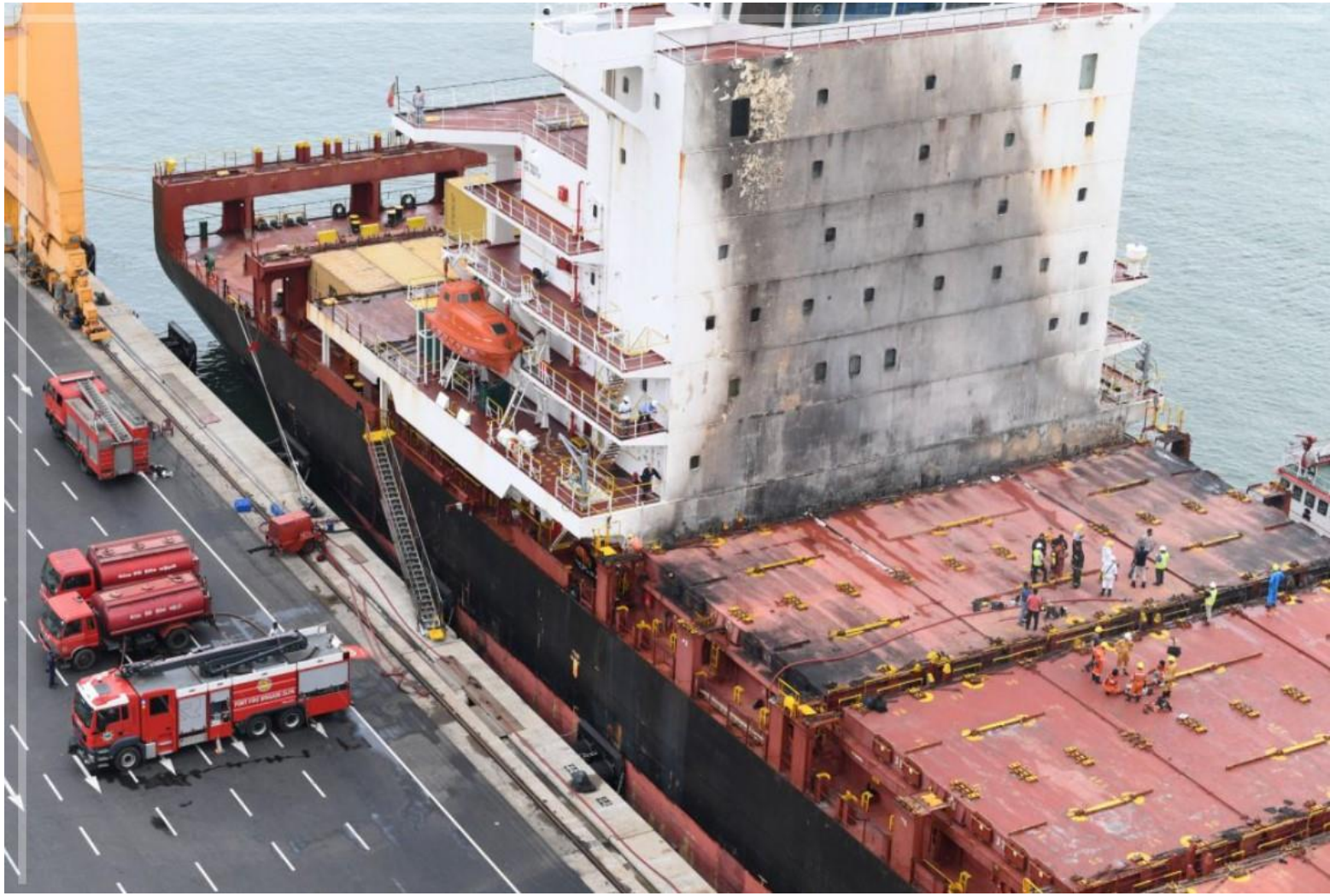
Particularly in an enclosed space this could lead to an explosion. In closed containers this may rupture violently when heated

Baltimore-Colombo sensationalized conspiracy theories on ship Dali. Certain print media, electronic media and social media, joined by the politicians of Sri Lanka, made a mockery out of a ship accident that happened in the territorial waters of the United States of America, on March 26, 2024. Written by Mr. Rohan Masukorala

https://www.dailymirror.lk/business/Baltimore-Colombo-sensationalised-conspiracy-theories-on-ship-Dali/215-280341#:~:text=Baltimore%2DColombo%20sensationalised%20conspiracy%20theories%20on%20ship%20Dali,-8%20April%202024&text=Certain%20print%20media%2C%20electronic%20media,%2C%20on%20March%2026%2C%2024.

MSC Cape town III

One of MSC container ships caught fire after an explosion in Sri Lanka's Colombo port on 11 August. The incident of the 2006-built, 2,824 TEU MSC Capetown III occurred in Colombo's Jaya Container Terminal around 1 am local time.



Q & A


THANK
YOU!