

GOVERNMENT CHEMIST LABORATORY AUTHORITY

GUIDELINES FOR MANAGEMENT OF DANGEROUS GOODS IN TANZANIA

M. Mtenga

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PRESENTATION LAYOUT

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INTRODUCTION

- GCLA - the regulator of industrial and consumer chemicals under the ICCA and its Regulations of 2020.
- The Act provides mandate to CGC and Registrar of chemicals to make guidelines for sound management and effective control of chemicals.
- The increase of economic activities in Tanzania and neighboring countries has resulted into increased imports, transports and use of dangerous goods in the Country.

INTRODUCTION ...

- GCLA has developed these Guidelines for management of dangerous goods to:
 - i. Fulfill the obligations stipulated under the Act
 - i. Provide further guidance for sound management of dangerous goods at ports and its associated ICDs, industries, warehouses and during transportation.
 - ii. Ensure dangerous goods/chemicals are properly managed for protection of human health and the environment.
 - iii. Classify and label dangerous goods

INTRODUCTION ...

- The development of these Guidelines involved consultation of various literatures to build up evidences and existing experiences on management of DGs.
- The consulted literature include:
 - International Maritime Dangerous Goods Code
 - Manual for Handling of Dangerous Goods; Transport, Handling and Storage of Dangerous Goods,
 - Guidelines for Port Users in Abu Dhabi;
 - Dangerous Goods Management Manual in Thailand;
 - Code of Practice for the Management of Dangerous Goods in Emirate of Dubai; and
 - Guidelines for Handling and Transportation of Dangerous Goods in Canada.

OBJECTIVE OF THE GUIDELINES

- Specifically, the Guidelines is expected to will provide guidance on:
 - Classification and labeling of dangerous goods based on their intrinsic properties.
 - Sound management of dangerous goods based on their classification, intrinsic properties and experience from other international ports.
 - Elaborate legal requirements and administrative procedures for handling and transportation of dangerous goods at the Ports, Inland Container Depots (ICDs), Industries, Warehouses and during transportation as per ICCA requirements.

RATIONALE FOR DEVELOPMENT

- The Rationale for Development of the Guidelines are:
 - The requirements for sound management of dangerous goods are as provided under the ICCA and its Regulations of 2020.
 - The Act and its Regulations empower the Registrar of industrial and consumer chemicals who is also the Chief Government Chemist to develop and implement guidelines for sound management of chemicals in the country.
 - Article 4.4 (i) of the Standard Operating Procedures (SOP) of the Port of Dar es Salaam of 2015 endorsed by all port stakeholders, recognizes:

RATIONALE ...

- The Rationale for Development of the Guidelines are:
 - the GCLA as the competent authority for provision of guidance for sound management of dangerous goods/chemicals in the port.
 - In addition, the development of these Guidelines, have been based on guidance from International Maritime of Dangerous Goods and experiences from ports of other countries.

DG Classification

Based on the code assigned

- **Class 1:** Explosives
- **Class 2:** Gases
- **Class 3:** Flammable Liquids
- **Class 4:** Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases.
- **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

DG Classification

Explosives

Division 1.1: Substances and articles which have a mass explosion hazard.

Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard.

Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Note: The asterisks are replaced by the class number and compatibility code



DG Classification



Explosives – Substances and articles which are classified as explosives but which present no significant hazard.

Division 1.4

Note: The asterisk is replaced by the compatibility code



Explosives – Very insensitive substances which have a mass explosion hazard

Division 1.5

Note: The asterisk is replaced by the compatibility code



Explosives – No hazard statement

Note: The asterisk is replaced by the compatibility code

DG Classification

Flammable gases – Gases which at 20 °C and a standard pressure of 101.3 kPa:

- are ignitable when in a mixture of 13 percent or less by volume with air; or
- have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit.



Alternative sign

Division 2.1

DG Classification



Division 2.2

Non-flammable non-toxic gases – Gases which:

- are asphyxiant – gases which dilute or replace the oxygen normally in the atmosphere; or
- are oxidizing – gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does; or
- do not come under the other divisions.



Alternative sign



Division 2.3

Toxic gases – Gases which:

- are known to be so toxic or corrosive to humans as to pose a hazard to health; or
- are presumed to be toxic or corrosive to humans because they have an LC₅₀ value equal to or less than 5000 ml/m³ (ppm).

e.g. hydrogen cyanide

DG Classification

Class 3: Flammable liquids



Flammable liquids – Liquids which have a flash point of less than 60 °C and which are capable of sustaining combustion



Alternative sign



Flammable solids, self-reactive substances and solid desensitized explosives – Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive substances which are liable to undergo a strongly exothermic reaction; solid desensitized explosives which may explode if not diluted sufficiently

Division 4.1

DG Classification



Substances liable to spontaneous combustion – Substances which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire

e.g. manganese heptoxide

Division 4.2



Substances which in contact with water emit flammable gases – Substances which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities



Alternative sign

Division 4.3

DG Classification



Division 5.1

Oxidizing substances – Substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material



Division 5.2

Organic peroxides – Organic substances which contain the bivalent $-O-O-$ structure and may be considered derivatives of **hydrogen peroxide**, where one or both of the hydrogen atoms have been replaced by organic radicals



Alternative sign

Class 6: Toxic substances and Organic peroxides

DG Classification



Toxic and Infectious substances –
Substances with an LD₅₀ value \leq 300 mg/kg (oral) or \leq 1000 mg/kg (dermal) or an LC₅₀ value \leq 4000 ml/m³ (inhalation of dusts or mists).

Division 6.1

e.g. nearly everything that contains cyanide groups



Infectious substances

Division 6.2

DG Classification

Class 7: Radioactive Material



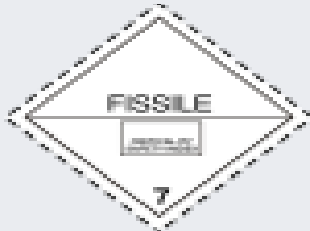
Category I – White (symbol 7A)



Category II – Yellow (symbol 7B)



Category III – Yellow (symbol 7C)



Fissile - Criticality safety index label (symbol 7E)

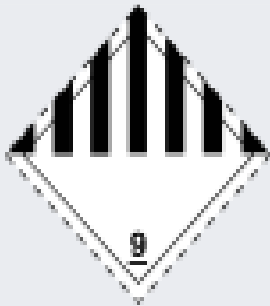
Class 7

DG Classification



Class 8

Corrosive Substances – Substances which: cause full thickness destruction of intact skin tissue on exposure time of less than 4 hours; or exhibit a corrosion rate of more than 6.25 mm per year on either steel or aluminium surfaces at 55 °C



Class 9

Miscellaneous dangerous substances and articles

DG Classification

- These classification is very important and must be followed by those who handles dangerous goods.
- Consideration must be made prior to stowage, segregation, marking, labeling and storing dangerous goods safely.
- Those who manages and handle dangerous goods,
 - must know exactly what hazards and
 - risks are associated with the respective dangerous goods being handled and
 - precautions must be taken to protect health and the environment.

SPECIFIC REQUIREMENTS FOR DG MANAGEMENT

- **Class 1:** the classification system relate to the sensitivity, mass explosion hazard and projectile hazard of a particular type of explosive.
- The classification system relate to the sensitivity, mass explosion hazard and projectile hazard of a particular type of explosive.
- Typical commercial blasting type explosives are classified as Division 1.1 Compatibility Group D (commonly depicted as 1.1 D);

Requirements for Class 1

- Explosives must not be unloaded from a vessel unless the means of transport,
 - ✓ by which they are to be removed from the port area, are on the terminal or berth and ready to receive them.
- Explosives must not be handled during the hours of darkness.
- Explosives of Divisions other than 1.4 must be taken directly to or from a vessel, and in no circumstances be held on a berth for more than 2 hours.
- Explosives (excluding Division 1.4) must not be brought to a berth for loading onto a vessel unless the vessel is ready to receive them.

Requirements for Class 1

- The handling of explosives, once commenced, must proceed without delay or interruption.
- Explosives must not be handled unless they have been classified in accordance with the IMDG Code.
- A vehicle must leave the port area as soon as possible on completion of being loaded with explosives (excluding Division 1.4) and
 - ✓ in all circumstances within 2 hours of the explosive being unloaded from the vessel.
- Emergency Procedures for the terminal or berth, developed in conjunction with the Regulator and the emergency services, must be in place before any explosives are handled

Requirements for Class 1

- A traffic management plan for the terminal or berth must be in place for road vehicles carrying explosives.
- Road vehicles carrying explosives must be at least 100 meters apart while waiting to load a vessel and/or leaving the port area.
- Whilst explosives are being handled, ignition sources must not be permitted in or near handling areas.
- Smoking must be strictly prohibited on the vessel and on the berth (except in safe areas).
- Notices must be displayed on the vessel and on the berth bearing the words **DANGER-NO SMOKING-NO NAKED LIGHTS.**

Requirements for Class 1

- Adequate and appropriate firefighting facilities and water must be immediately available on the vessel and fire hoses on it laid out ready for use (not applicable to Division 1.4 explosives).
- Vessel and shore personnel must receive prior instruction regarding the hazards, handling methods and emergency procedures for explosives.
- Repairs involving hot work are prohibited on the vessel or on the berth whilst explosives (excluding Division 1.4) are being transported or handled.
- Explosives must be segregated from incompatible cargoes, combustibles and other Dangerous Goods at all times.

Requirements for Class 2

- Have the following properties:
 - flammable properties when mixed with air;
 - toxic properties;
 - displacement of oxygen in the air and potential to cause asphyxiation;
 - stored energy from being held under very high pressure;
 - potential to cause freezing when released or vapourised.
- Examples of class 2
 - Class 2.1 Flammable Gases – e.g. LPG, acetylene, natural gas and hydrogen;
 - Class 2.2 Compressed Gases (non flammable, non toxic) – e.g. nitrogen, carbon dioxide and argon; and
 - Class 2.3 Toxic Gases – e.g. liquefied chlorine, sulfur dioxide and anhydrous ammonia.

Requirements for Class 3

- These are flammable liquids are classified and has ability to burn in the presence of oxygen.
- These class include; products such as petrol, kerosene, paints, solvents and alcohol.
- Some flammable liquids are more hazardous (flammable) than others due to
 - differences in either the temperature at which they ignite, the energy required for ignition or the range of concentrations in air at which they are flammable.
- Each flammable liquid is assigned a Packing Group (i.e. the PG I, PG II or PG III descriptor) to indicate the relative level of hazard it presents.

Requirements for Class 4

- Class 4 is referred to as flammable solids into the following three sub-classes:
 - Class 4.1 – flammable solids (e.g. sulphur, matches);
 - Class 4.2 – substances liable to spontaneous combustion (e.g. xanthates);
 - Class 4.3 – substances, which in contact with water emit flammable gases (e.g. calcium carbide, iron swarf).
- It is sufficient to note that the substances are generally solid and will either burn readily in the presence of oxygen (sometimes without an ignition source) or will release a flammable substance when wet.
- Flammable solids are each assigned a Packing Group (i.e. the PG I, PG II or PG III descriptor).

Requirements for Class 5

- Class 5 DG are oxidising substances, when in contact with other substances are capable of burning they supply oxygen to enable the other substances to burn (in place of the oxygen normally obtained from the air).
- Oxidising substances provide a plentiful supply of oxygen exactly where it is needed
 - The substances that may burn slowly in air will often burn fiercely or even explode when in contact with an oxidising substance.
- Methyl Ethyl Ketone Peroxide (MEKP) and benzoyl peroxide are examples of organic peroxides.

Requirements for Class 5

- The combination of oxidising substances with flammable liquids can lead to:
 - fire or explosion without the presence of an ignition source
 - it is critical that oxidising substances and flammable liquids/gases/solids be separated at all times.
- Some oxidising substances can ignite and explode when heated or contaminated, due to rapid decomposition.
- Typical examples of oxidising Agents are ammonium nitrate and solid pool chlorine.

Requirements for Class 6

- Toxic substances may be solid or liquid.
- They can cause harm through inhalation, ingestion or absorption and they can vary significantly in respect to their degree of toxicity.
- The use of Packing Groups (i.e. the PG I, PG II or PG III descriptor) gives immediate indication of the degree of harm presented by the material.
- Packing Group I toxic substances such as sodium cyanide are extremely toxic.
- Packing Group III toxic substances such as many of the household pesticides/herbicides present a much lower hazard.

Requirements for Class 7

- Any material with a specific activity greater than 70 kBq/kg is declared radioactive.
- Radioactive materials emits invisible radiation that may damage body tissue.
- The degree of hazard presented by radioactive materials varies significantly, being a function of the type of material, its specific activity and the duration of exposure.
- The International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Materials.

Requirements for Class 8

- Corrosive substances may be solid or liquid, acidic or caustic and mildly or extremely corrosive.
- Corrosives is on living tissue (organic material) and metals, the criteria upon which they are classified involves skin and metal corrosively testing.
- Some corrosives can cause severe burns to skin, eyes and mucous membranes.
- Many are sufficiently volatile to evolve vapour and subsequently cause harm.
- Others are capable of producing toxic gases when decomposed by high temperatures.

Requirements for Class 9

- Class 9 substances and articles (miscellaneous dangerous substances and articles) are
 - substances and articles which, during handling or transport, present a danger not covered by other classes.
- As such many different products, and consequential potential hazards, fall within the scope of Class 9.
- Examples include life saving appliances, lithium batteries and genetically modified organisms GMOs.
- Class 9 substances may be solid or liquid, acidic or caustic and mildly or extremely corrosive.

DG MANAGEMENT

Time Limitation for Each Class of Concern: It is strongly recommended that the time DGs are kept within a Port area is minimized to minimizing risks associated with handling of DGs

Dangerous Goods for Two (2) Hours Maximum

- All IMDG Class 1 and Class 7 Dangerous Goods, except Class 1.4 and Class 7 Low Specific Activity (LSA) cargo, must:
 - ✓ Be removed from a port area within two hours of being unloaded from a vessel; and,
 - ✓ Not enter a port area more than two hours prior to the cargo being loaded onto a vessel.

DG MANAGEMENT ...

Dangerous Goods for Twelve (12) Hours Maximum

- All Dangerous Goods specified in [Table 2](#) must:
 - Be removed from the Port area within twelve hours of being unloaded from a vessel; and,
 - Not enter a port area more than twelve hours prior to the cargo being loaded onto a vessel.

DG MANAGEMENT ...

Dangerous Goods for Twelve (12) Hours Maximum

Dangerous Goods	Quantity Limit
IMDG Class 1.4 & Class 7	Any
IMDG Class 2.1 (excluding UN 1950-Aerosols)	More than 500kg
IMDG Class 2.3	More than 500kg
IMDG Class 3 Packing Group 1	More than 500kg
IMDG Class 4 Packing Group 1	More than 500kg
IMDG Class 5.1 Packing Group 1	Any
Ammonium Nitrate (Class 5.1) UN No's 1942, 2067, 2426 and 3375	Any
Calcium Hypochlorite (Class 5.1) UN No's 1748, 2880, 3485 and 3487	Any
IMDG Class 6.1 Packing Group 1	Any
IMDG Class 8 Packing Group 1	More than 500kg
Dangerous Goods in bulk.	Any

DG MANAGEMENT ...

Dangerous Goods for Five (5) Days Maximum

- All Dangerous Goods of IMDG Class 2, 3, 4, 5, 6, 8 or 9 other than those in [Table 2 above](#) and cargoes listed in [Table 2](#) not exceeding 500kg mass must:
 - Be removed from a port area within five days of being unloaded from a vessel; and
 - Not enter a port area more than five days prior to the cargo being loaded onto a vessel.

DG MANAGEMENT ...

Packaging, Labeling and Placarding

- All DG delivered to or from a port area must be packaged, marked, labeled and placarded in accordance with the IMDG Code
- The packages/containers must be in good condition, correctly marked, labeled, signposted and not affected by cargo it contains.
- For packing purposes, DG belonging to all classes except for class 1, 2, 6.2 and 7:

DG MANAGEMENT ...

- Have been divided into three “packing groups” depending on the degree of danger they present:
 - **Packing Group I** – High level of danger
 - **Packing Group II** – Medium level of danger
 - **Packing Group III** – Low level of danger
- It is required that, cargo transport units shall abide to the following placarding requirements:
 - Containers carrying dangerous goods must display at least one placard on each side and one on each end of the unit (this is to say, on its four sides).

DG MANAGEMENT ...

- All types of transport units apart from a container carrying dangerous goods must display at least one placard on each side and one on each end of the unit (this is to say, on its four sides).
- Rail wagons must be placarded on at least both sides
- Road vehicles must display appropriate placards on both sides as well as the rear.

DG MANAGEMENT...

Storage, Segregation and Compatibility of Dangerous Goods

- The storage of Dangerous Goods will not normally be permitted in the port beyond the time limits specified above.
- All Dangerous Goods requiring storage must be removed to an authorized ICDs for dangerous goods or any other designated facility for the same purpose.
- Many dangerous goods are incompatible with other substances.
- They may react with other dangerous goods or chemicals, or with apparently harmless substances, such as dust, air or water.

DG MANAGEMENT...

- Bringing incompatible dangerous goods into contact with each other,
 - whether during transport or storage, or during use where the risks haven't been properly assessed, can have serious consequences.
- The most common way that dangerous goods come into contact with incompatible substances are:
 - spillages or leakages and liberated toxic gases, which cause a fire or explosion.
- *Dangerous goods with the exception of class 1, 6.2 and 7, must stored according compatibility chart.*

DG MANAGEMENT

Requirements for ICD's Registration to Handle Dangerous Goods

- Requirements for ICDs to be registered for handling of dangerous goods:
 - Application letter highlighting the type of business and dangerous goods to be handled.
 - Environmental Impact Assessment Certificate/Environmental Audit Certificate (EIA/EAC) covering the types of dangerous goods to be handled.
 - Certificate of academic of a qualified person in-charge of Dangerous goods management (Dangerous Goods safety Officer).
 - Personal Protective Equipment (PPE) as provided in the MSDS with respect to the type of the dangerous goods

Some PPEs include:



DG MANAGEMENT

- Requirements for ICDs to be registered for handling of dangerous goods:
 - Breathing apparatus and Cyanide Detectors.
 - Calibration machines for cyanide detectors or MOU with approved organizations for detectors calibration.
 - Respirators, Face masks, Gloves, Chemical suits, Safety boots, Eye goggles.
- Adequate operational space for convenient management of respective DGs.
 - Contingency plans with respect to the types of DG to be managed.
 - Trained personnel & drivers for transporting DGs.

DG MANAGEMENT

- Certificate of Incorporation or Extract certificate.
- GCLA pay in receipts.
- Certificate of Tax Identification Number (TIN).
- Filled application forms for registration through CCMP online Portal for certificate holder, premises and chemicals.
- Copy of the extract of the Material Safety Data Sheet which shows the type of chemical and ingredient.
- Business License.

DG MANAGEMENT

- The transfer of DG to ICDs shall adhere to the requirements of these Guidelines as follows:
 - Dangerous goods should be transferred only to authorized ICD for handling DG.
 - DG should be transferred to ICDs using authorized transporters for transportation of DG.
 - Any ICD handling DG must be authorized by GCLA.
 - Damaged containers should not be taken out of the vessel and neither transferred to the ICDs.
 - Handling and transferring of DG should be done using appropriate facilities and equipment as per MSDS.

DG MANAGEMENT

- All workers involved in transferring of DG they must be given the necessary precautions and provided with appropriate PPEs.
- Any person driving a vehicle carrying DG shall be required to undergo special training on chemical management at the GCLA or other recognized institution.
- A vehicle carrying a dangerous good shall:
 - be provided with an appropriate first aid kit;
 - be fixed with posters, according to the transported goods;
 - be provided with appropriate spill kit as per MSDS.
 - be done by trained personnel for leading the convoy who shall be responsible for informing the Registrar of any occurrence of incidences while en-route.

EMERGENCY RESPONSE PLANS (ERP)

- ERP is made to establish preventative measures, but do not guarantee that, a major incident will not occur.
- It is essential to have in place effective emergency arrangements in the event of an accident occurring
- The main objective of an ERP is to protect people, minimize damage to property and the environment.

Emergency Response Plan

- All ports should have an ERP ready for immediate implementation in the event of an emergency
- In general, the ERP should address: all possible types of emergencies that can occur

THANK YOU FOR YOUR ATTENTION