GOVERNMENT CHEMIST LABORATORY AUTHORITY (GCLA)

EMERGENCE PREPAREDNESS AND RESPONSE IN CHEMICALS MANAGEMENT

TRAINING TO CHEMICAL SUPERVISORS

COVERAGE

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2. HAZARDOUS CHEMICALS Vs ACCIDENTS
3. EXAMPLES OF CHEMICAL ACCIDENTS
4. CHEMICAL EMERGENCY PREPAREDNESS
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1.0 INTRODUCTION

- According to the UNEP Global Chemicals Outlook II, the market size of the global chemical industry exceeded USD 5 trillion in 2017 and is **expected to double by 2030**.
- Growth in the industrial sector in our country has been of huge positive impact to our economic development.
  - However, some of the chemicals used in industrial operations present a risk of chemical accidents that can cause extensive harm to people, the environment, local or even national economies, huge loss of property, etc.
  - **Safety and accident prevention** should be an integral part of discussions on the green transition and growing environmental issues.

1.0 INTRODUCTION..

- **Chemical accident:** any unplanned event involving **hazardous substance(s**) – such as a spill, release, fire, or explosion that may cause harm to health, the environment, or properties.

❖ **Many of the chemical accidents that continue to take place have similar causes and could have been prevented if lessons learnt from past accidents had been implemented**.

2.0 HAZARDOUS CHEMICALS AND ACCIDENTS

A hazardous chemical is a substance or mixture that may pose harm to human health, facilities/property, and the environment. It will have one or more of the following characteristics:

- Irritant
- Corrosive
- Harmful to health
- Toxic or very toxic
- Flammable / explosive
- Reactive
- Oxidiser (reactive with other chemicals)
- Hazardous to the environment
- Compressed gas

2.0 HAZARDOUS CHEMICALS...

- In Tanzania, several national legislations, policies, regulations and guidelines pertaining to proper management of chemicals have been established – ICCA.
- On the Industry side, only few are implementing necessary measures to prevent the chemical accidents.
- Various accidents involving hazardous chemicals occurs in Tanzania – costly in terms of human lives, environment and properties.

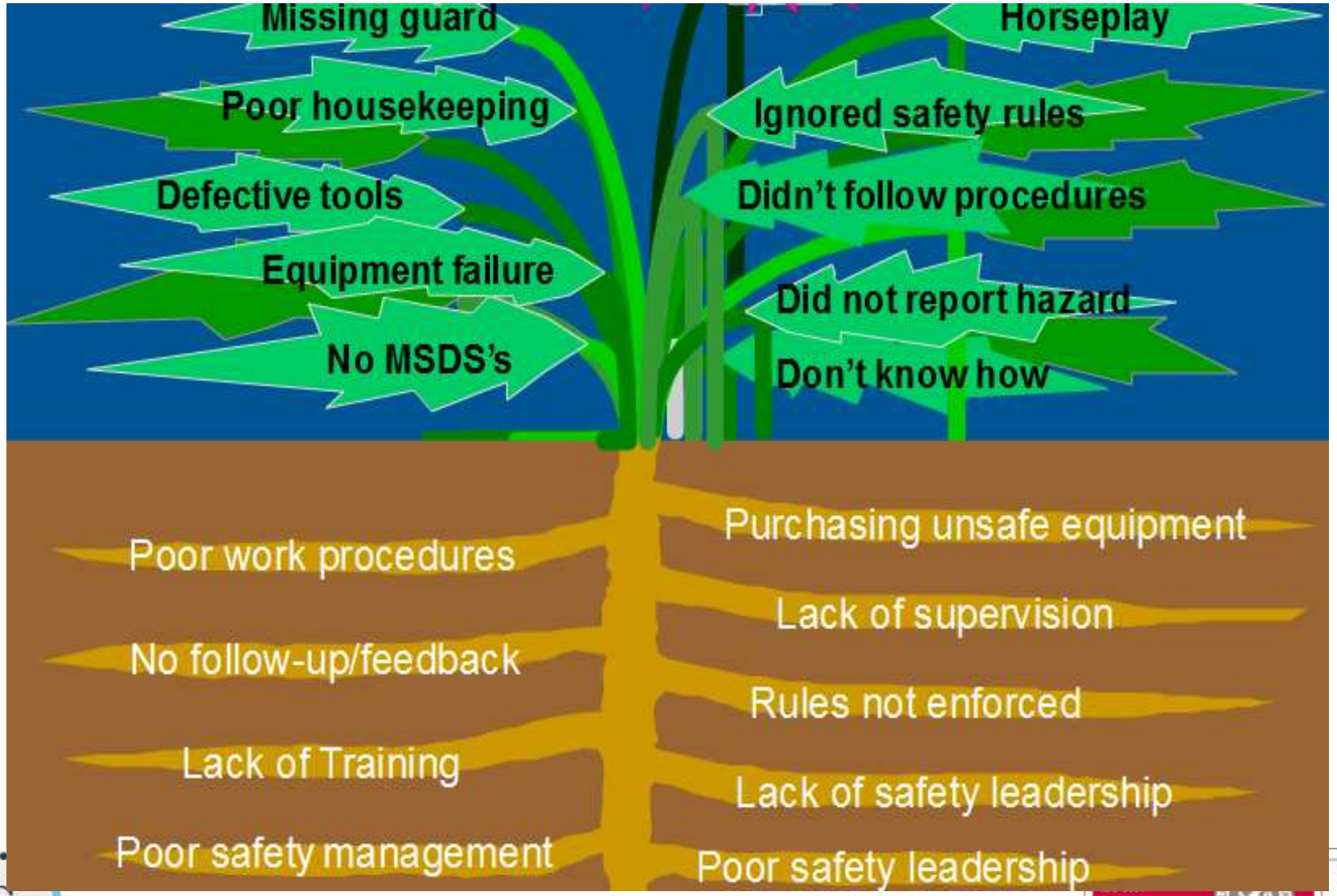
2.0 HAZARDOUS CHEMICALS...

- Accidents are caused by unsafe acts and conditions.
  - ✓ Unsafe acts account for **88%** of accidents
  - ✓ Unsafe conditions account for **12%** of accidents.

- The unsafe Acts and Conditions are contributed by lack of commitment from the TOP MANAGEMENT.
  - ✓ *Analysis of past incidents reveals that inadequate leadership, poor organisational culture and lack of safety management have been recurrent features,*
  - ✓ *There is a need for high standards of corporate governance and safety Management.*

2.0 HAZARDOUS CHEMICALS...

CAUSES OF ACCIDENTS – ROOTS AND BRANCHES



3.0 EXAMPLES CHEMICAL ACCIDENTS

A truck Accident transporting Sulfur occurred at Ruaha Mbuyuni (19/07/2024)

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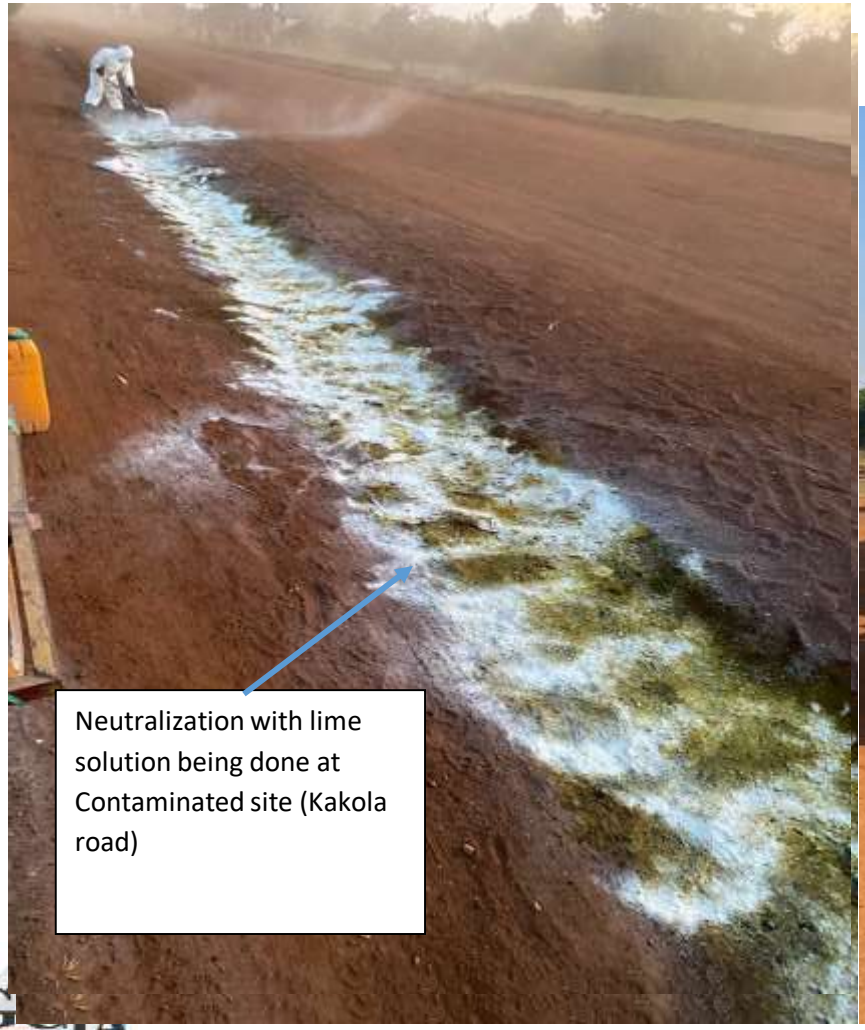


Neutralization with lime solution being done at Contaminated site (Kakola road)

The chemical carrying truck whose two drums of hydrochloric acid leaked being parked along Kakola road.

3.0 CHEMICAL ACCIDENTS…

- Chemical-laden tanker caught fire following an accident and exploded on Pune-Mumbai (June, 2023) – 4 killed, 3 injured

3.0 CHEMICAL ACCIDENTS…

- On 4 August 2020, a cargo 2,750 tones of ammonium nitrate stored at the port of Beirut, Lebanon exploded - at least 218 deaths, 7,000 injuries, and USD15 billion property damage, an estimated 300,000 people homeless.

4.0 CHEMICAL EMERGENCY PREPAREDNESS

ICCA section 45 - take such steps and otherwise observe such precautions as needed to ***prevent accidents*** and therefore harm to human health and environment. Such steps include:

- ✓ monitoring of safety, through adequate maintenance of operations and inspections;
- ✓ choice of adequate route avoiding obstacles, peak hours and densely populated areas and hence have a suitable carriage;
- ✓ avoiding over loading of chemicals;
- ✓ taking precautions consummerate to properties of the chemical;

4.0 CHEMICAL EMERGENCY PREPAREDNESS..

An ***emergency*** is the state in which normal procedures are interrupted, and immediate measures (management) need to be taken to prevent it from becoming a disaster, which is even harder to recover from (WHO).

4.0 CHEMICAL EMERGENCE PREPAREDNESS..

Emergency management is the organization and management of the resources and responsibilities for dealing with all aspects of emergencies (prevention, preparedness, response, mitigation, and recovery). The aim is to prevent and reduce the harmful effects of all hazards.

4.0 CHEMICAL EMERGENCY PREPAREDNESS..

Purposes of Emergency Preparedness and Response

- ❖ Minimize the risks of emergencies occurring
- ❖ Identify potential emergency situations
- ❖ Develop, implement, and test plans to respond promptly and effectively to emergencies
- ❖ Minimize the impact to the environment

4.0 CHEMICAL EMERGENCY PREPAREDNESS..

Ways to Identify Potential Emergencies

- Review incident reports for past years
- Check statistics on incidents and emergencies at other similar operations
- Identify environmental aspects for potential emergencies under abnormal operating conditions
- Gather a group of personnel representing each function in the organization to brainstorm possible incidents and emergencies

4.0 CHEMICAL EMERGENCY PREPAREDNESS..

Potential Emergencies

- ✓ Fire, explosion
- ✓ Gas leak, spill
- ✓ Natural disasters - flood, extreme weather
- ✓ Tank, equipment structural failure
- ✓ Electric power or gas cut
- ✓ Crash, collision,
- ✓ Road condition
- ✓ Sabotage, vandalism, terrorist attack, riot, bomb threat,

4.0 CHEMICAL EMERGENCY PREPAREDNESS

Potential Hotspots

- Hazardous chemicals installations & storages
- Transportation of DG
- Hazardous chemical waste storage
- Bulk oil and fuel tanks
- Process start-up and shut-down
- High pressure vessels
- Waste treatment facilities

5.0 EMERGENCY MANAGEMENT CYCLE

5.0 EMERGENCY MANAGEMENT CYCLE...

Mitigation (Prevention)

- ✓ Mitigation is taking action now—before the next disaster—to reduce human, environmental and financial consequences later.
- ✓ It involves analyzing risk, reducing risk, and insuring against risk.
- ✓ Mitigation is achieved through implementation of regulations from the Govt as well as internal SOPs, work instructions

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness

- Preparedness is a continuous cycle of *planning, managing, organizing, training, equipping, exercising, creating, monitoring, evaluating* and improving activities to ensure effective coordination.

- It is enhancement of capabilities of the company to *prevent, protect against, respond to, recover from, create resources* and *mitigate the effects* of hazardous chemicals.

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness

Handling of DC Incidents or Emergencies requires…… *PREPARATION*
This also helps in the prevention of DC Emergencies, because people become *AWARE*…….. and…
"failure to prepare is a clear call of accident

START BY ASKING YOURSELF
WHICH DCs DO YOU DEAL WITH?
List the ALL DCs you deal with regularly

- ✓ Sodium cyanide?
- ✓ Hydrochloric acid?
- ✓ Hydrogen peroxide?
- ✓ Ammonium nitrate?

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness..

BEFORE you handle any DG:

- **A RISK ASSESSMENT (RA**) must be completed especially during Incidents or Emergencies.
- Create a CONTROL for the RISKS identified.
- ALL Personnel must be prepared to handle an Emergency.
  - They need Training, Tools & Equipment to deal with ANY DG Emergency.

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness..

BEFORE you handle any DG:

- During Emergencies they need:

  MSDS/SDS:.....must be available and understood.

  PPE:..... must be available to protect workers.

  TOOLS:.... for spill containment and clean-up.

  CHECKS:.. regularly for trucks; tools; equipment; etc, to ensure they are available to handle DGs.

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness..

Five-Step approach to prepare for Emergencies

1. READ THE MSDS
   - ✓ What PPE needed?
   - ✓ What Tools needed?
   - ✓ What Equipment needed?
2. ASSEMBLE TOOLS & EQUIPMENT
3. WRITE PROCEDURES
4. TRAIN PERSONNEL
5. TEST PROCEDURES

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness..

What Training Is Required?

This will depend upon the DGs handled

General Training:

- INDUCTIONS: Company and Job/Area Specific, DGs in the workplace, Basic Spills Procedures, etc.
- CHEMICAL AWARENESS: Reference MSDS/SDS & CHEM-CARD, Routes of Entry, PPE, Basic Emergency Procedures, etc.
- GENERAL EMERGENCIES for all employees Fire Extinguishers, First Aid, etc.

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness..

What Training Is Required?

SPECIFIC TRAINING:

- SPECIFIC DCs:
  Based on MSDS and CHEM-CARDS
- JOB SPECIFIC :
  - ✓ Convoy Procedures
  - ✓ Defensive Driving
  - ✓ Cyanide, AN Awareness
  - ✓ Rollover Prevention
  - ✓ Transport of Dangerous Goods (TDG)
  - ✓ Cryogenic Liquids
  - ✓ First Aid - Red Cross
  - ✓ Fire -FIRE BRIGADE
  - ✓ Tyre Management
- EMERGENCY PROCEDURES
  Based on most toxic Chemical with reference on other Chemicals

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

Establish Emergence Response Team

- ✓ Depending on the scope of your operations, Ensure you maintain a list of personnel who are trained in various requirements for Hazardous chemicals Emergency Response.
- ✓ It should also include: Police, Hospital, Fire Brigade, competent institution/companies.

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

You are required to:

- ✓ Develop Early Warning Method for Releases (Sensors/Alarms)
- ✓ Develop Emergency Evacuation Written Plans, Evacuation Maps & Assembly Points
- ✓ Determine Emergency PPE Requirements
- ✓ Train Employees/workers on Emergency Evacuation Plans
- ✓ Drill The Emergency Evacuation Plan (at least once per year)

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

Warning Systems must:

- Clearly Notify Employees of the Hazardous Release
- Employees/workers must be trained in the Meaning of the Alarm(s)

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

Hazardous Chemicals require Emergency PPE to be Worn:

- FRP
- Escape Respirators
- Eye Protection,
- etc.

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

Drills:

- At Least Annual Emergency Preparedness Drills
- It must Include Response
- Must Document Results

5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

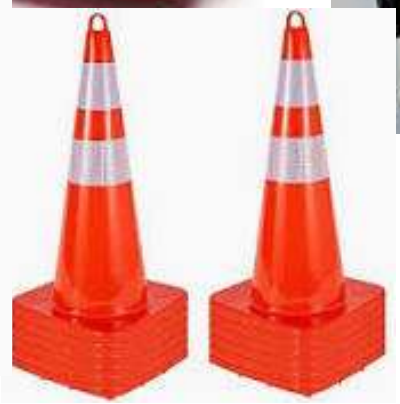
Drills...:

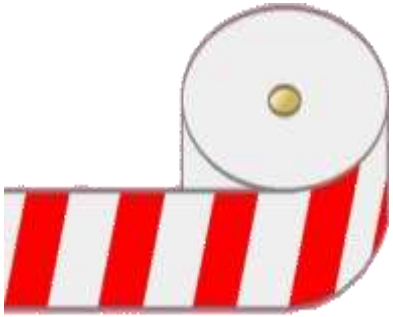
After the Drill (or after an Incident)

- BRIEF ALL those involved
- Write up the INCIDENT REPORT
- Determine any CHANGES required
- Set up an ACTION PLAN for those changes
- Update the PROCEDURES
- RE-TRAIN the personnel in the new Procedures
- RE-TEST the new Procedures

5.0 EMERGENCY MANAGEMENT CYCLE...

- **Tools** – shovels, brushes, hoes,
- **Equipment** – fire extinguishers, First Aid Kits, triangles, tool kits, barrier tapes, traffic cones, gas detectors,





5.0 EMERGENCY MANAGEMENT CYCLE...

Preparedness...

WHEN IS THE BEST TIME TO PREPARE FOR AN EMERGENCY?

a) Before it occurs

(b) After it occurs

(c) Well before it occurs

(d) b and c

5.0 EMERGENCY MANAGEMENT CYCLE...

Response

- mobilization of the necessary emergency services and first responders.
  - firefighters, police and ambulance crews

5.0 CHEMICAL ACCIDENTS PREVENTION…

Response...

First responders – supervisors/workers must be;

- ✓ Knowledgeable about the Emergency Response requirements
- ✓ Aware of the hazardous chemicals and their effects
- ✓ Aware of the company's contingency plan
- ✓ Able to organize the tools, equipment and PPE
- ✓ Aware of the MSDS
- ✓ Trained (inductions, chemical awareness, emergency procedures)

3.0 CHEMICAL ACCIDENTS PREVENTION…

Response...

In an emergency/accidents:

- ✓ Consider your safety first, then other's – PPE enforcement
- ✓ Consider evacuation of people from down-wind areas
- ✓ Consider Ground Slope - for liquid substances or when it is raining
- ✓ Consider scene isolation from people or wildlife (barrier tapes, traffic cones, alarm signals)
- ✓ Report the incidence to the regulatory authorities

5.0 CHEMICAL ACCIDENTS PREVENTION…

Recovery

- ✓ The aim of recovery is to restore the affected area to its previous state.
- ✓ Recovery can start along side the response effort, or begin later.
- ✓ The recovery process can be short-term or long-term depending on the incident, but the main goal is to return the community to normal.

7.0 CONCLUSION

Chemical accidents can be reduced to zero, if there is full participation and commitment of all relevant working group members.

As responsible Chemical dealers, you must be able to properly handle, store, use and transport DCs and any incidents that may occur during your operations, be on store, process facility and/or on the road.

To do this, We must have competent people who can respond to DC accident.