

GOVERNMENT CHEMIST LABORATORY AUTHORITY

CHEMICAL HAZARD IDENTIFICATION AND COMMUNICATION

**Chemicals Management and Control Training,
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OUTLINE

- ✓ Introduction
- ✓ Ways of identifying hazards
- ✓ Hazards communication
- ✓ Tools/ ways of communicating hazards
- ✓ Dangerous goods
- ✓ Control of hazards
- ✓ Conclusion

1. INTRODUCTION

✓ WHAT IS AN HAZARD?

- Hazard can be defined as any piece of equipment, substance or work practice that could **reasonably** be expected to cause **significant harm** under certain conditions. Example toxic chemicals, electricity, working on ladders, noise, vibrations, moving parts of machines.
- Hazards may cause loss of life, injuries or other health impacts, property damage, loss of livelihoods and services, social and economic disruption or environmental damage.

2. HAZARD IDENTIFICATION

- ✓ A careful examination of work place to identify potential hazards that will affect the health and safety of employees and other exposed persons.
- Hazards can be identified by examining the range of work activities and any potentially harmful equipment or substance present at work place and this may attribute the need for **conducting risk assessment**.
- ***Walk-around inspection*** and ***Job Hazard Analysis (JHA)*** are commonly employed techniques.
- Once the hazard is identified, control measures can be taken in attempt to tackle the hazards at the source. Example avoiding the use of harmful substance/ doing substitution, fitting suitable protective guards around dangerous machine equipment.

3. HAZARDS COMMUNICATION

- ✓ Hazard communication (HazCom) is the process of addressing and informing the employees about the potential hazards in the workplace.
- ✓ It is of paramount important to protect people from injuries and illnesses associated with using hazardous chemicals in workplace.
- ✓ Chemical Hazards are communicated through trainings on specific chemicals to employees on how to safely handle and use chemicals using tools such as Safety Data Sheets (SDSs) that come with every chemical, warning signs and proper labels.

4. WAYS/ TOOLS OF IDENTIFYING AND COMMUNICATING HAZARDS

- ✓ Five tools can be employed in identifying and communicating chemical hazards in the workplace;
 - Chemical labels
 - Safety data sheets (SDSs)
 - Warning signs.
 - Colour and Numbers
 - Classes of Dangerous Goods

A. HAZARDOUS MATERIAL LABELLING

- All chemicals in the workplace must have labels. The label should contain the identity of the material, appropriate hazard warnings, and the name and address of the manufacturer, importer, or other responsible party.
- Labels must be legible and in English. Labels in a second language may be added as long as the English label is present.
- **Secondary chemical** containers must be labeled after emptying chemicals from primary containers.



A. HAZARDOUS MATERIAL LABELLING...

- ✓ Information found at the label of the chemical container:

The Basic Parts of A GHS-Compliant Label

1 → **n-Propyl Alcohol**

UN No. 1274
CAS No. 71-23-8

2 → **DANGER**

3 → Highly flammable liquid and vapor. Causes serious eye damage.
May cause drowsiness and dizziness.

4 → Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid breathing fumes/mist/vapours/spray. Wear protective gloves/protective clothing/eye protection/face protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present. Continue rinsing.

Fill Weight: 18.65 lbs. Lot Number: B56754434
Gross Weight: 20 lbs. Fill Date: 6/21/2013
Expiration Date: 6/21/2020

5 → Acme Chemical Company • 711 Roadrunner St. • Chicago, IL 60601 USA • www.acmechem.com • 123-444-5567

See SDS for further information.

6 →

1. **Product Identifier** - Should match the product identifier on the Safety Data Sheet.
2. **Signal Word** - Either use "Danger" (severe) or "Warning" (less severe)
3. **Hazard Statements** - A phrase assigned to a hazard class that describes the nature of the product's hazards
4. **Precautionary Statements** - Describes recommended measures to minimize or prevent adverse effects resulting from exposure.
5. **Supplier Identification** - The name, address and telephone number of the manufacturer or supplier.
6. **Pictograms** - Graphical symbols intended to convey specific hazard information visually.

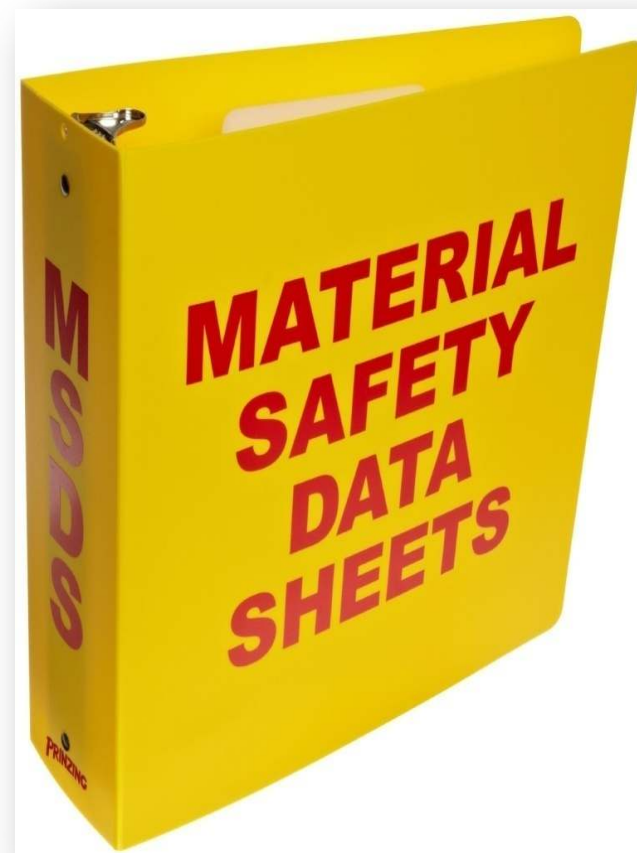
B. WORKPLACE WARNING SIGNS

- Warning signs (such as pictures and symbols) may be used to portray hazard/obstacle or condition requiring special attention in a workplace,
- Addresses physical hazards such as flammability, compressed gases, explosives, organic peroxides, oxidizers, unstable reactive agents. Also identify Health and Environmental hazard,
- Indicate access authorization and restrictions,
- Requirement to use PPEs.



C. SAFETY DATA SHEET (SDS)

- ✓ A Safety Data Sheet (formerly called Material Safety Data Sheet) is a detailed document that contains information about a given chemical.
- ✓ The information contained in the SDS must be in English (Although it may be in other languages as well)
- ✓ SDS must be current and easily accessed by every one at the workplace



PART OF SAFETY DATA SHEET (SDS)...

A standard SDS has 16 sections (headings).

1. Product Identification

- Chemical name, manufacturer name and contact info, recommended use, and restrictions

2. Hazard Information

- Hazard class such as skin irritation or serious eye damage
- Signal Word, DANGER for severe hazards or WARNING for less severe hazards.
- Symbols and Precautionary Statements

PART OF SAFETY DATA SHEET (SDS)...

3. Information on Ingredients

- Chemical Mixture ingredients

4. First-Aid

- Information on symptoms, effects, and required treatment

5. Fire Fighting

- Appropriate fire extinguisher or other equipment

6. Accidental Release

- Emergency procedures, protective gear, and proper clean-up

PART OF SAFETY DATA SHEET (SDS)...

7. Handling and Storage

- Safe handling, proper storage, and incompatible chemicals

8. Personal Protection/Exposure Controls

- Exposure limits, engineering controls, and personal protective equipment

9. Physical and Chemical Properties

- Appearance, odor, flash point, pH, vapor density, evaporation rate, and viscosity

PART OF SAFETY DATA SHEET (SDS)...

10. Stability and Reactivity

- Chemical stability and hazardous reactions

11. Toxicology

- Likely routes of exposure (inhalation, ingestion, skin and eye contact), dose, etc.
- Related symptoms

12. Ecological Information

- Chemical effects on the environment

13. Disposal

- Proper disposal information

PART OF SAFETY DATA SHEET (SDS)...

14. Transportation Information

15. Regulatory Information

- Regulations specific to the chemical

16. Other Information

- Date the SDS was prepared or updated

TRANSLATED SDS

➤ KADI YA USALAMA YA ETHANOL ILIYOTAFSIRIWA KWA KISWAHILI

MADHARA YA KIAFYA

- ✓ **Ukimeza:** inaleta kichefuchefu, kutapika, kuharisha, inaharibu ini, madhala kwenye mfumo wa fahamu, kusinzia, kuwasha kichefuchefu kuharisha kicha kuuma na mwishoe kifo
- ✓ **KWENYE MACHO** :Inasababisha muwasho kwenye macho, Inachubua macho, inaharibu mishipa ya macho na inasababisha machozi
- ✓ **Kwenye Ngozi** :Husababisha Ngozi Kuwasha, kuchubuka na maumivu makali
- ✓ **Ikitokea Umeivuta:** Inaweza Kusababisha madhala kwenye mfumo wa upumuaji, maumivu ya kichwa, kichefuchefu, pia inasababisha kuwasha kwenye mfumo wa upumuaji.

HUDUMA YA KWANZA

- ✓ **IKITOKEA IMEGUSA KWENYE NGOZI** osha kwa maji mengi kwa muda wa dakika kumi na tano ondoa nguo ulizomwagikiwa nazo zifue kabla ya kutumia tena
- ✓ **IKITOKEA IMEINGIA KWENYE MACHO** osha macho kwa maji mengi kwa muda wa dakika 15 badae muone daktari
- ✓ **IKITOKEA AMEIMEZA** mpe mwadhilika vikombe 2-4 vya maziwa au maji alafu mpeleke akapate msaada wa kidaktari
- ✓ **IKITOKEA UMEVUTA HEWA YAKE** mtoe mwadhilika mpeleke kwenye hewa safi, mpe msaada wa kupumua au oksijeni alafu mpeleke akapate msaada wa kidaktari

NJIA ZA KIJIKINGA

KWENYE MACHO-Vaa miwani ya macho iliyoidhinisha na OSHA
KWENYE NGOZI-Vaa gloves sahihi, vaa nguo sahihi

UTUNZAJI

Tunza mbali na moto,cheche na mwako wa moto

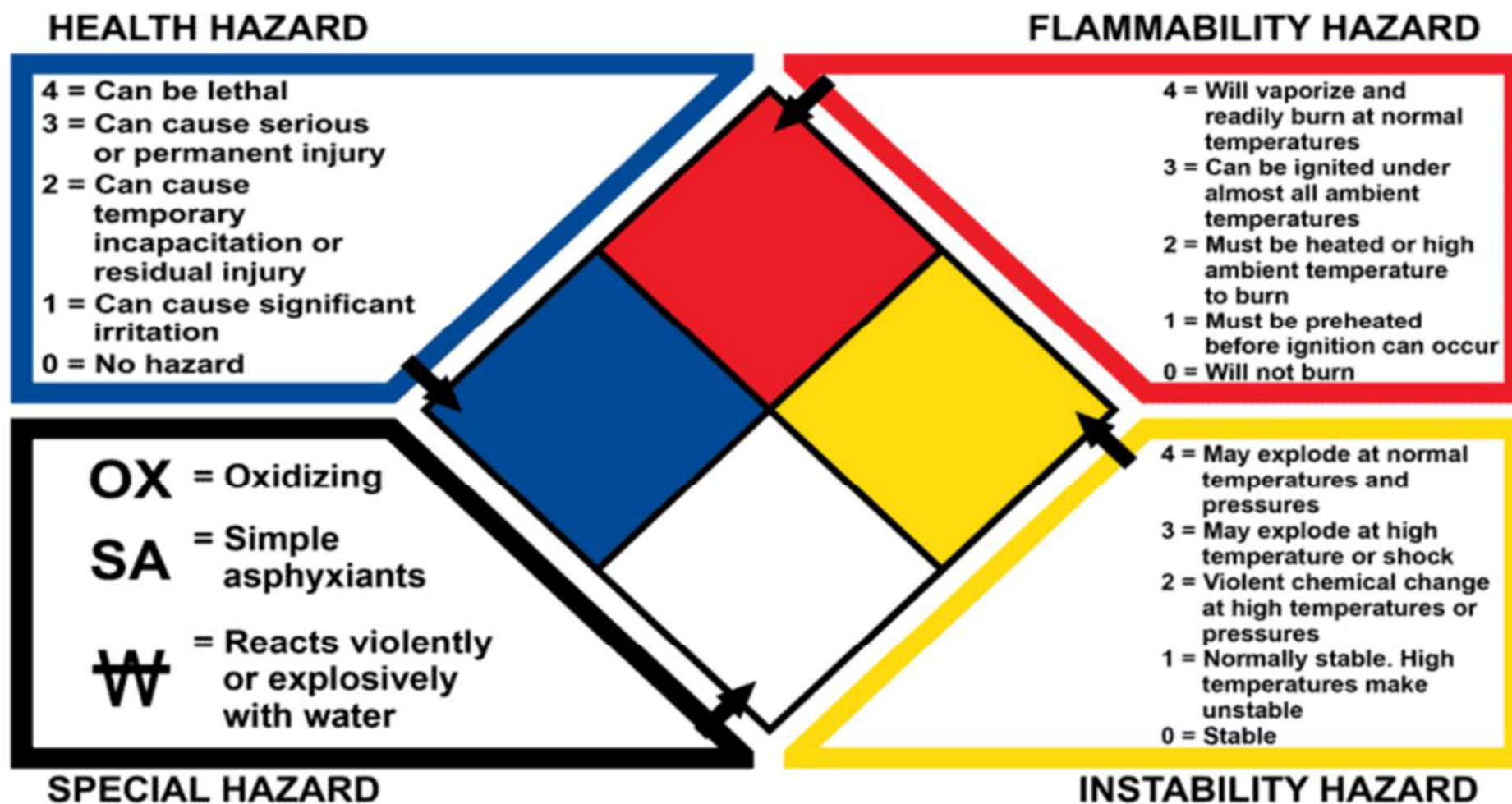
- ✓ Tunza mbali na vyanzo vya kuwasha moto
- ✓ Tunza kwenye contena lililofungwa vizuri
- ✓ Tunza kwenye eneo tulivu, kavu na lenye hewa ya kutosha

D. COLOURS AND NUMBERS

- ✓ National Fire Protection Association (NFPA-USA) has developed a system for indicating the hazards (Health, Flammability, and reactivity) of chemicals in a diamond shaped object called “NFPA Hazard Rating Diamond”
- ✓ The system is displayed as a rotated square shape, broken up into 4 sub squares. The material hazard is described within each of the 4 sub squares as the degree of severity, degree of flammability, and degree of stability with health at the 9 o'clock position, flammability at 12 o'clock position, and stability at 3 o'clock position.

D. COLOURS AND NUMBERS....

- ✓ Colors are used to further distinguish the hazards, with **red referring to flammability**, blue referring to health, and yellow referring to instability/ reactivity.



D. COLOURS AND NUMBERS...

- ✓ Health hazard rankings, GHS ranks health hazards differently than National Fire Protection Association (NFPA) and Hazard Material Information System (HMIS).
- GHS ranks health hazards category 1 as the most hazardous with category 5 as the least hazardous.
- NFPA/ HMIS ranks health hazards category 4 as the most hazardous with category 0 as the least hazardous.
- Colours represent kind of hazard and numbers indicate degree of hazard.

D. COLOURS AND NUMBERS

NFPA, HMIS and GHS

HMIS/NFPA

0 = Minimal Hazard

1 = Slight Hazard

2 = Mod. Hazard

3 = Serious Hazard

4 = Severe Hazard



GHS

Cat. 1 = Severe Hazard

Cat. 2 = Serious Hazard

Cat. 3 = Moderate Hazard

Cat. 4 = Slight Hazard

Cat 5 = Minimal Hazard



D. COLOURS AND NUMBERS ...

Example 1.

Ammonium Nitrate



Colorless crystals; odorless. Irritating to eyes/skin/respiratory tract. Also causes: difficulty breathing, acidic urine, systemic acidosis, and abnormal hemoglobin. Strong oxidizer capable of igniting combustible materials.

CAS No. 6484-52-2

Burning of the eyes, nose, throat and RT result to blindness, lung damage or death



Nitrous Oxide

Colorless gas; slight sweet odor, inhalation of small amounts causes euphoria. Higher levels cause drowsiness, incoordination and unconsciousness. Contact with the compressed gas can cause frostbite. May present a reproductive hazard in women.



5. CLASSES OF DANGEROUS GOODS

- ✓ DG classification is the process of identifying intrinsic character of a certain hazardous materials.
- ✓ It's about getting the information needed for decisions about risk control to be made, so that chemicals can be produced, transported, used and disposed of safely.
- ✓ The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) classifies chemicals by types of hazard. It helps communicating information about hazardous chemicals on labels and safety data sheets.

5. CLASSES OF DANGEROUS GOODS...



CLASS 1-Explosives

CLASS 2-Gases

CLASS 3-Flammable liquids

CLASS 4-Flammable solids

CLASS 5-Oxidizers

CLASS 6-Toxic materials




CLASS 7-Radioactive materials

CLASS 8-Corrosive materials




CLASS 9-Miscellaneous dangerous goods

DANGEROUS- Indicates a mixed load of hazardous materials




5. CLASSES OF DANGEROUS GOODS...

S.No	Classes	Pictogram	Examples
1	Class 1 Explosives		Ammonium Permanganate Acetone Peroxide Ammonium Chlorate
2	Class 2 Compressed Gases		Anhydrous Ammonia Carbon Dioxide Propane
3	Class 3 Flammable Liquids		Ethyl acetate Ethanol Methanol

5. CLASSES OF DANGEROUS GOODS...

S.No	Classes	Pictogram	Examples
4	Class 4 – Flammable Solids		Calcium Carbide Aluminium Phosphide Sulphur
5	Class 5 –Oxidizing substances		Hydrogen Peroxide Nitric Acid Magnesium Nitrate Potassium Dichromate Ammonium Nitrate
6	Class 6 –Toxic Chemicals		Mercuric chloride Cyanide TDI

5. CLASSES OF DANGEROUS GOODS...

S.No	Classes	Pictogram	Examples
7	Class 7 – Radioactive		Uranium
8	Class 8 – Corrosive		Sulfuric Acid Caustic soda Hydrochloric Solution
9	Class 9 – Miscellaneous dangerous chemicals		Lubricants Glue Magnesium oxide

OTHER GHS SYMBOLS

Health Hazard



- Carcinogenic effect,
- Respiratory track,
- Reproductive system,
- Mutagenicity.



- Cause irritation at the skin, eyes and respiratory track
- Examples; Sulfur, Sodium metabisulphite,

OTHER GHS SYMBOLS...

Environmental Hazard



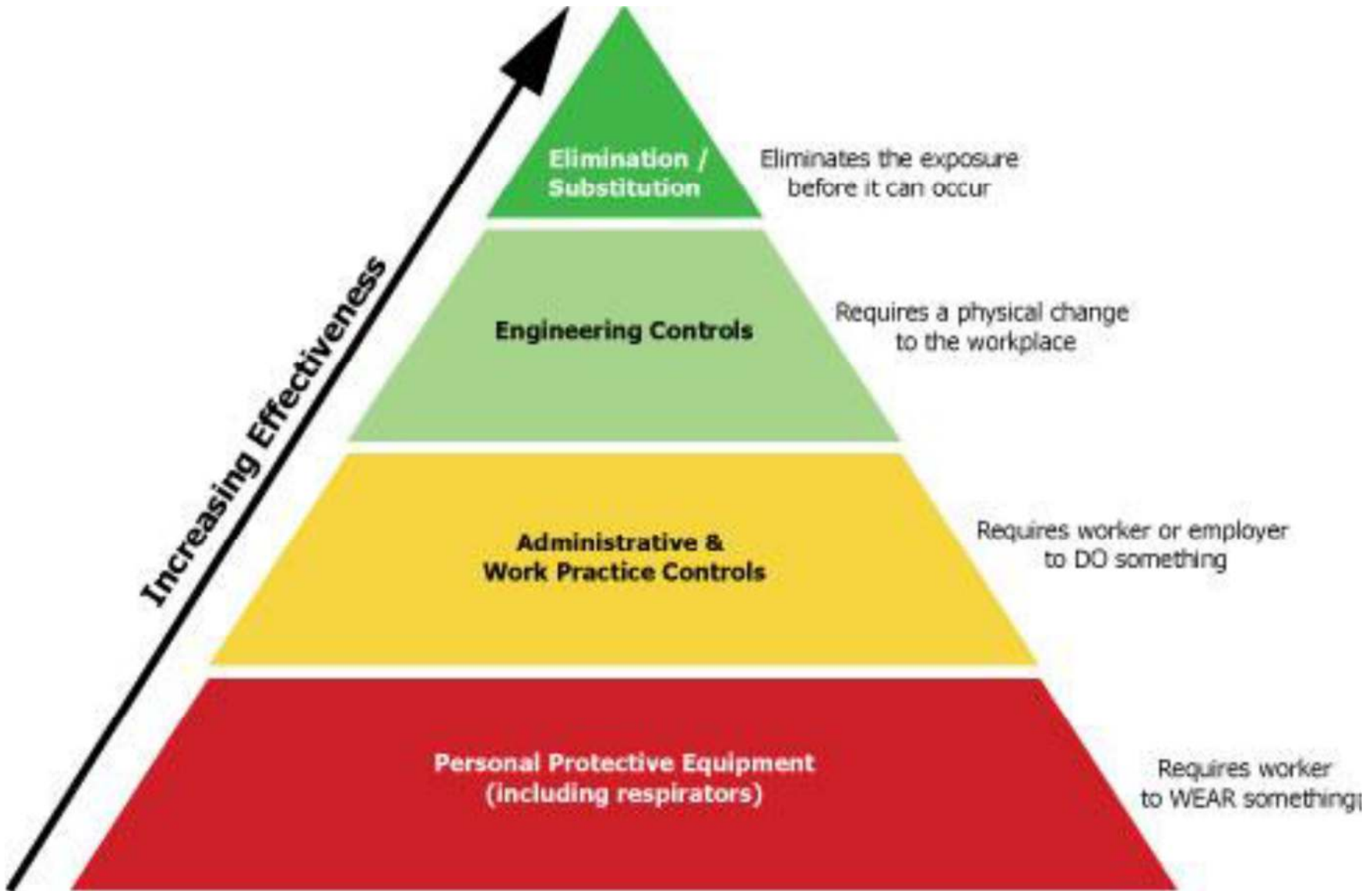
- Adversely effect to aquatic plants and animals
- Adversely effect to air and water quality
- Soil contamination

6. WORKPLACE HAZARDS CONTROLS

- ✓ Controlling exposures to occupational hazards is the fundamental key to protecting workers in their workplace,
- ✓ Hierarchy of controls has been used as means of determining how to implement feasible and effective controls which include;
 - Hazards elimination,
 - Hazards substitution,
 - Engineering controls,
 - Administrative controls, and
 - Person protective equipment (PPEs).
- ✓ The idea behind this hierarchy is that, the controls method at the top are potentially more effective and protective than those at the bottom.

6. WORKPLACE HAZARDS CONTROLS...

Hierarchy of controls



6. WORKPLACE HAZARDS CONTROL...

- ✓ The Administrative controls;
 - Establish HazCom and safety programs,
 - Implementation of **MBO** (alignment, responsibility and accountability),
 - Trainings on using information on labels, SDSs, and how to obtain and use available hazards information,
 - Knowing hazard chemicals at work place,
 - Protective measures in place, such as the use of Person Protective Equipment (PPEs)
 - Awareness on detection of the presence or release of hazardous chemicals,
 - Addressing restrictions such as Smoking, eating, drinking while working with chemicals,
 - Proactive and Reactive strategies.

6. WORKPLACE HAZARD CONTROLS..

- ✓ The training at workplace must address the following;
 - Location and availability of SDSs and written safety programs;
 - Physical hazards, Health hazards and any other additional hazards,
 - Chemical list, location, nature and uses of such chemicals,
 - Secondary container labeling system,
 - SOPs to protect employees from chemical hazards,
 - Methods used to detect the presence or release of hazardous chemicals (alarms, odor, visual, monitoring devices

CONCLUSION

- ✓ Ensure the hazards of chemicals found in the workplace are effectively identified, addressed and communicated to employees so they can properly handle, store, and transport chemicals while protecting themselves during normal use or upon accidental release.
- ✓ Effective implementation of this process will increase the level of safety at the workplace and reduce the rate of injuries/chemical accidents.

Thank you for your attention

