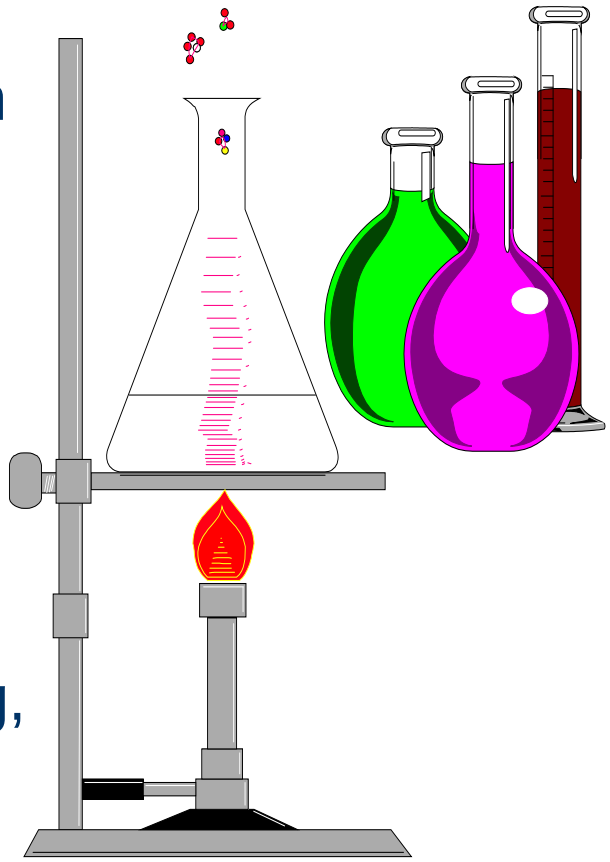
Control Of Substances Hazardous to Health (COSHH)

Chemical Handling

- What is a CHEMICAL?
- A chemical is a substance that can take part in a reaction with another
- Chemicals can be liquid, solid or gas
- Chemicals are so diverse that subject is a science of it's own
- Chemicals can be harmless, harmful, reactive, flammable, toxic, explosive, bio-hazardous, oxidizing, corrosive, or any combination of else



Chemical Handling

- Most Chemicals are dangerous in one way or another.
- Can you tell which is which???

243
Am
AMERICIUM
95

112
Cd
CADMIUM
48

35
Cl
CHLORINE
17

Material Safety Data Sheet (MSDS)

- Quite simply you cannot. But we have a very good system of finding;
- Material Safety Data Sheet (MSDS)
- MSDS is the information relating to that chemical's properties
- This must include the hazards to life and health and the precautions to take when dealing with chemical

Risk Phrases

- Chemical data sheets contain codes for certain "risk phrases". These risk phrase codes have the following meanings:
- R1 Explosive when dry.
- R2 Risk of explosion by shock, friction, fire or other source of ignition.
- R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.
- R4 Forms very sensitive explosive metallic compounds.
- R5 Heating may cause an explosion.
- And on to R65!!!!

Safety Phrases

- **MSDS may also have “SAFETY PHRASES-**
- **Safety phrase codes have the following meanings:**
- S1 Keep locked up.
- S2 Keep out of the reach of children.
- S3 Keep in a cool place.
- S4 Keep away from living quarters.
- S5 Keep contents under ... (there follows the name of a liquid).
- And so on to S62!

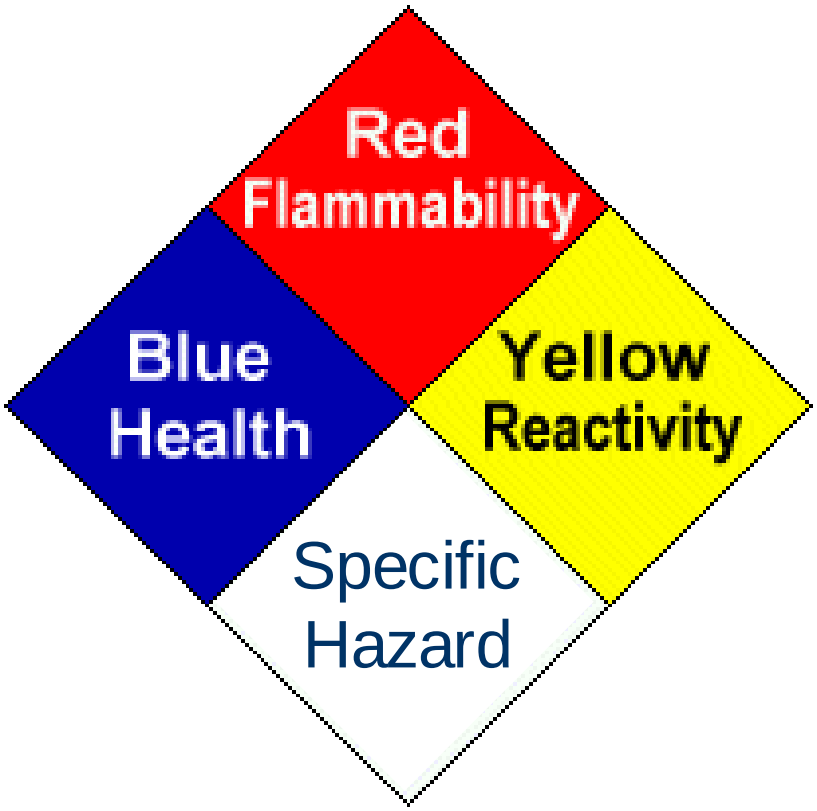
Material Safety Data Sheet (MSDS)

MSDSs are available from;

- **Manufacturers**
- **Internet**
- **Suppliers**

Chemical Label

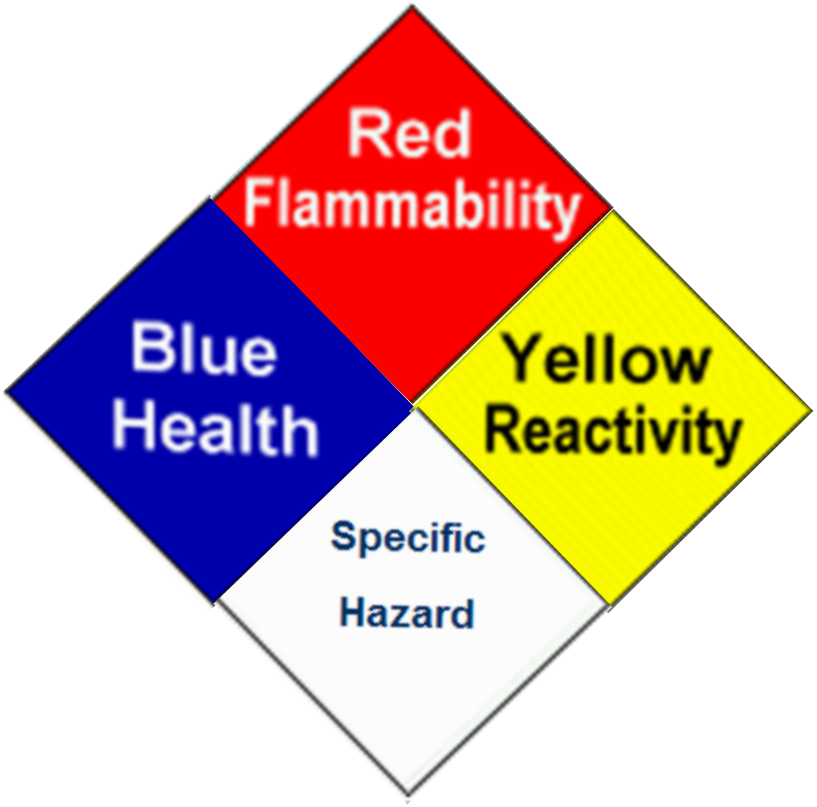
- In addition to MSDS, all chemical containers and packaging must be properly labelled.
- The label will give brief but relevant information on the hazards and handling
- Hazard Rating is also important for quick determination of the classification of the substance



Chemical Label

Four Hazard Parameters

- Health
- Flammability
- Reactivity
- Specific Hazard (NFPA)



Hazard Rating Systems

Five Hazard Levels (NFPA)

0 Insignificant
1 Slight
2 Moderate
3 High
4 Extreme

Chemical Hazards

- Materials classified as 'Harmful' can exert harm on the body, but at relatively higher concentrations than those classed as Toxic.
- Materials are classified as Toxic if they cause harm to the body when taken in relatively small amounts.

Some specific types of toxicity can include the following;

- Carcinogenic: can cause Cancer.
- Mutagenic: can cause heritable genetic defects.
- Teratogenic: can cause deformities in the fetus.

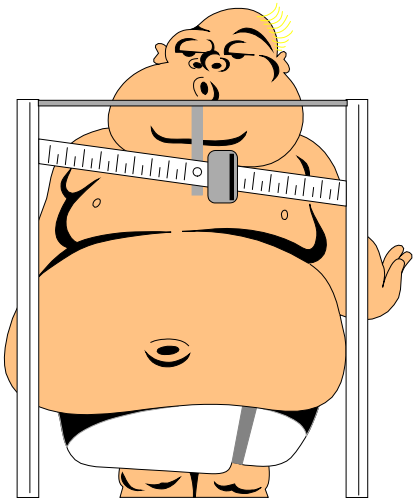
Chemical Hazard

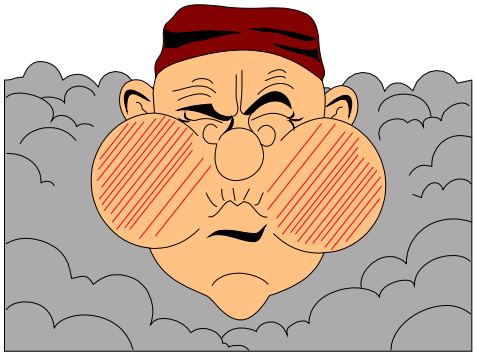
TOXICITY IS AFFECTED BY MANY FACTORS.

- Dose (concentration)
- Duration of exposure
- Route of exposure
- Presence of other chemicals which might react.
- General health / fitness of the individual.

Chemical Route of Exposure

- This can be by;
  - Inhalation
- Skin Absorption
  - Ingestion
  - Injection





Chemical Hazard

Flammable or Highly Flammable

- Flammable or Highly Flammable materials are generally those with a fire point of less than 55ºC

Corrosive

- This means can cause burning to other materials including skin

Chemical Hazards

- **Explosive material** is a material that is either chemically or otherwise energetically unstable or produces a sudden expansion of the material usually accompanied by the production of heat and large changes in pressure upon initiation
- **Oxidizer** – oxygen support rapid combustion, the more oxygen the more possible of explosion. An **oxidizing agent** (also called an **oxidant** or **oxidizer**) is
  - A chemical compound that readily transfers oxygen atoms or
  - A substance that oxidizes another substance

Chemical Handling

It is a requirement of International Law that chemicals sold for industrial use must be accompanied by a Material Safety Data Sheet (MSDS) which gives details on the hazards of the material and the proper handling precautions to be used

Chemical Handling

Materials are classified as hazardous if they belong to one or more of the following UN Hazard Classification groups:

There are nine dangerous goods classes:

Class 1	Explosives
Class 2	Gases
Class 3	Flammable Liquids
Class 4	Flammable Solids, Spontaneously Combustible Substances & Dangerous When Wet
Class 5	Oxidizing Agents and Organic Peroxides
Class 6	Toxic and Infectious Substances
Class 7	Radioactive Substances
Class 8	Corrosives
Class 9	Miscellaneous Dangerous Goods

Chemical Inventory

- This is required for all chemicals in all areas.
- It requires constant updating
- The information must be passed to HSE
- It must be compiled by a responsible person.

Chemical Inventory

INFORMATION ON THE CHEMICAL INVENTORY-

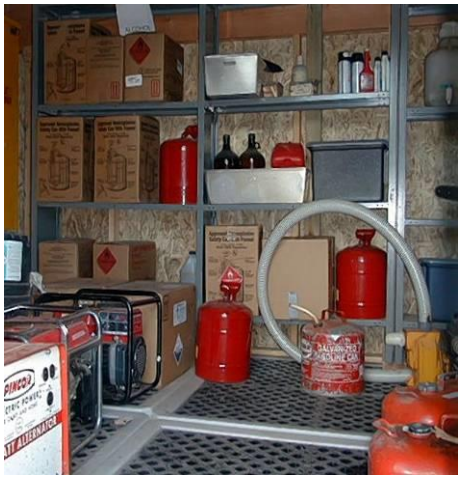
- Name & contact information for persons responsible for the area or chemicals
- Date the list was compiled or updated
- Chemical name – The common trade, product or chemical name. Typically this is the name given on the manufacturers label.
- Location – Give common storage location for the chemical in area. This is to help identify the location of hazardous materials in work area in case of emergency.

Chemical Inventory

- Manufactures name – Give the name of manufacture, supplier or distributor for the product or chemical. This will match the MSDS
- Typical maximum quantity – This will be the maximum amount that is commonly kept in this location
- Amount – This will be in total volume, mass, weight.
- Units – For volume litre, millilitres, pints, or gallons; for mass grams or kilograms will be used.

Contact with Chemical

1. TRANSPORTATION
2. STORAGE
3. HANDLING
4. DISPOSAL



Transportation

- The delivery truck must have the information necessary for the emergency services to deal with any spillage, fire or accidental release of the contents.
- When taking delivery of chemicals, they should remain in their packaging until they are safely in the place they are going to be used.
- All the necessary equipment / PPE should be available

Storage

- Before storing any chemical, make sure to check the label on the container to determine the hazard class & precautions to be taken
- Do not store incompatible materials together. Separate incompatible materials by distance or barrier
- Always segregate chemicals BY HAZARD CLASS, and not alphabetically or by use. Make sure to keep all OXIDISERS well away from FLAMMABLES and other reactive or combustible materials

Storage

- Make sure that all label information on containers of hazardous materials is clear and legible. This rule also applies to WASTE material containing hazardous chemicals.
- Keep all stocks of hazardous materials in any area (both good stock & waste) to a minimum.
- Never store hazardous chemicals above eye level where stretching is necessary to obtain them.

Storage

- Restrict access to toxic storage areas whenever possible.
- Ensure that there is adequate means of dealing with spillage and fire situations and that PPE is available
- Ensure adequate ventilation

Handling Chemicals

Always consult the Label information and the MSDS / Risk Assessment, before use of a Toxic chemical and obey the warnings and precautions given. Unless you know the substance is definitely not Toxic, *treat it as though it is.*

"Larry, did you replace the cartridges in *all* the respirators this morning?"

Handling Chemicals

- Since toxicity is affected by a range of factors, it is not possible to generalize on what protective equipment is necessary to be worn for any specific task. Before use of any Toxic / Harmful chemical, determine the Route of exposure (by Label information or MSDS and Risk Assessment) and take precautions to avoid exposure by that route.

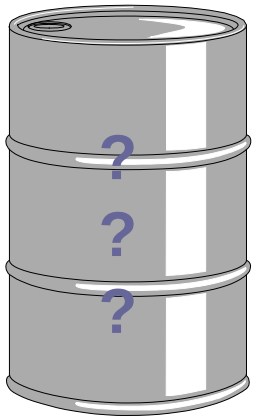
- Before beginning a task involving a Toxic / Harmful substance, lay out the workspace appropriately to avoid knocking over containers. Take care to prevent spills. In case of spills, immediately clean CAREFULLY (without raising clouds of dust / vapors) according to the Risk Assessment, and making sure that adequate protective equipment is worn.

Handling Chemicals

- Limit exposure as far as possible - work with the smallest possible amounts, and limit the number of people working in the vicinity where toxic substances are being used. Work in a fume hood or under local exhaust ventilation if available
- Avoid contact of chemicals with skin, eyes, mouth and clothing. Avoid inhalation of dust, vapors, mists or fumes. Wash hands before breaks and when finished work for the day.

Handling Chemicals

- Replace lids of Toxic/ Harmful substances on containers immediately after use, and return to appropriate storage areas.
- Never put Toxic / Harmful substances in un-labeled containers

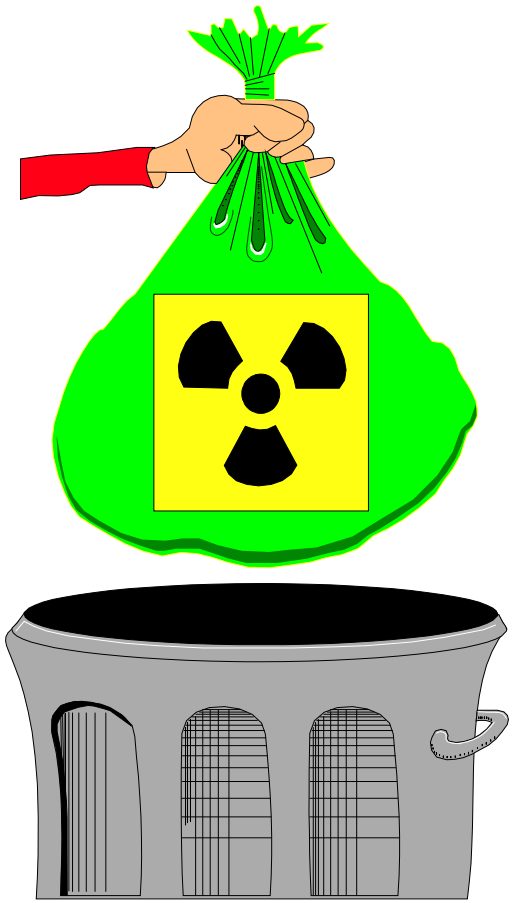


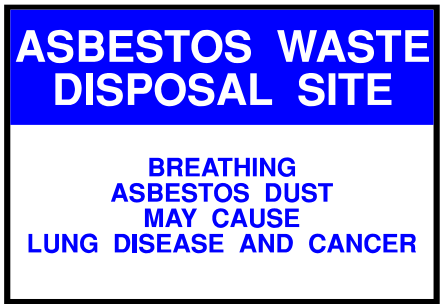
Disposal

- The disposal of used chemicals can sometimes be more hazardous than the use of them
- There is often an Environmental issue
- Waste handler tends to be relax and lacking of knowledge

Disposal

- Chemical waste disposal, Chemical Spillage and Response should be done as per instruction in the MSDS or Site Environmental Waste Management Plan





Site Common Chemicals/Substances

- Solvents
- Gasoline
- Diesel
- L.P.G.
- Acetylene
- Oxygen
- Argon
- Thinner
- Paints
- Waste Battery liquid
- Insulation materials
- Used oils
- Chlorine
- Adhesives
- Pressurised can(WD-40)
- Radiography materials
- insecticides
- Commissioning waste water

Personal Protective Equipment

While Handling hazardous substances PPE should be used such as;

- Respirators
- Gloves
- Apron
- Face shield
- Safety glass
- Coverall
- Or as specified in the MSDS or Site HSE Plan

PPE

1. Face and Eye Protection

- Protection required against splashes, particles and vapours

PPE

2. Body Protection
Coverall, aprons

3. Foot Protection

PPE

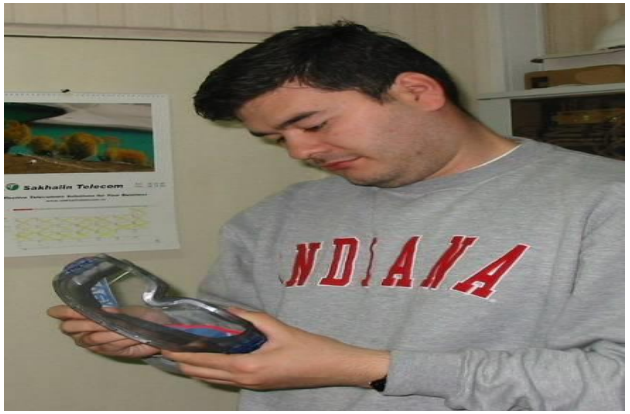
4. Hand Protection

5. Respirator

PPE Inspection

User shall check all his PPE prior to use;

- For integrity
- For clarity
- For fitting
- For fastening
- cleanliness



Summary

- AND W ARE FINISH -----
- CLEAN IT OSE IT.
- REMEMB E NEXT PERSON TO IT MIGHT