

Industrial & Management Engineering Department

# Industrial Relations

**IM 111**

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# Chemical Hazards

Chemical hazards may be classified into three categories

- Flammable hazards,
- Reactive hazards, and
- Health hazards.

## a) Flammable Hazards

- Flammable substances are those that readily catch fire and burn in air. A flammable liquid does not burn itself ; it is the vapour from the liquid that burn.
- For a liquid; the flash point, the auto-ignition temperature, the explosion limits, the vapour density and the ability to accumulate electrostatic charges that are important factors in determining the degree of fire hazard.
- Methane, acetone, aniline and lithium hydride are examples of flammable materials.

# Chemical Hazards

## b) Reactive Hazards

- Reactive chemical hazards invariably involve the release of energy (heat) in relatively large quantities or at a rapid rate.
- If the heat evolved in a reaction is not dissipated, the reaction rate can increase until an **explosion** takes place.
- Some chemicals decompose rapidly when heated. Light or mechanical shock can also initiate explosion reactions. Some compounds are inherently unstable and can detonate under certain conditions of pressure and temperature, while others react violently with water or when exposed to air.
- Ozone, chlorine, and nitrogen dioxide are oxidizing materials. These chemicals will support a fire and are highly reactive.
- Compounds containing the functional groups: azide, acetylide, diazo, nitroso, haloamine, peroxide, and ozonide are sensitive to shock and heat and can explode violently

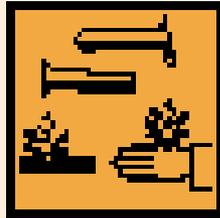
# Chemical Hazards

## c) Health Hazards

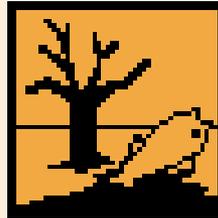
Contact with many chemicals can result in adverse health effects. The nature and magnitude of toxic effects will depend on many factors including:

- The nature of the substance,
- Route of exposure,
- Magnitude of dose,
- Duration of exposure, and
- Individual susceptibility.

# Chemical Hazard Symbols



CORROSIVE



DANGEROUS FOR THE ENVIRONMENT



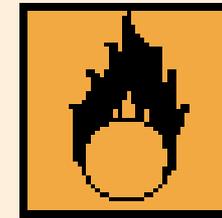
EXPLOSIVE



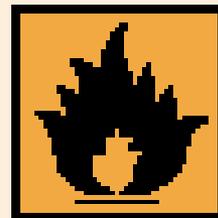
(VERY) TOXIC



HARMFUL/IRRITANT



OXIDISING



HIGHLY OR EXTREMELY FLAMMABLE

# Chemical Hazard Symbols



# Chemical Hazard Symbols

- **Explosive, E** – Chemicals that explode. A substance that may explode if it comes into contact with a flame or heat. It may also explode due to friction or shock.
- **Oxidizing, O** – Chemicals that react exothermally with other chemicals. This type of substance gives off a large amount of heat when in contact with other substances.
- **Toxic, T and Very Toxic, T+** - These impede or prevent the function of one or more organs within the body, such as the kidneys, liver and heart. A toxic substance is therefore a poisonous one.
- **Harmful** - This is the most commonly used classification and describes a substance which, if swallowed, inhaled or penetrates the skin **may** pose limited health risks. These health risks can usually be minimized or removed by following the instruction provided with the substance or following safe practices as outlined by Hazard Sheets supplied by chemical manufacturers.

# Chemical Hazard Symbols

- **Corrosive, C** - These are substances which will attack, normally by burning living tissue. Usually a strong acid or alkali. Examples include Sulphuric acid and Sodium Hydroxide.
- **Irritant, Xi** - is a non-corrosive substance which can cause skin [dermatitis](#) or lung (bronchial) inflammation after repeated contact. People who react in this way to a particular substance are **sensitised or allergic** to that substance. Acetone and formaldehyde are classed as irritants.
- **Sensitizing, Xn or Xi**
- **Carcinogenic, Categories 1 and 2, T**
- **Carcinogenic, Category 3, Xn** – These are chemicals that may cause cancer or increase its incidence.
- **Mutagenic, Categories 1 and 2, T**
- **Mutagenic, Category 3, Xn** – These are chemicals that induce heritable genetic defects or increase their incidence

# Chemical Hazard Symbols

- **Toxic for Reproduction, Categories 1 and 2, T**
- **Toxic for Reproduction, Category 3, Xn** – These are chemicals that produce or increase the incidence of non-heritable effects in progeny and/or an impairment in reproductive functions or capacity.
- **Dangerous for the Environment, N** – These are chemicals that may represent an immediate or delayed danger to one or more components of the environment.

# Chemical Hazard Symbols

## Symbol, abbreviation/description of hazard

### Hazard symbols - Physicochemical

| Symbol  | Abbreviation | Hazard              | Description of hazard   |
|---|--------------|---------------------|---|
|  | E            | explosive           | Chemicals that explode.   |
|  | O            | oxidising           | Chemicals that react exothermically with other chemicals.   |
|  | F+           | extremely flammable | Chemicals that have an extremely low flash point and boiling point, and gases that catch fire in contact with air.  |
|  | F            | highly flammable    | Chemicals that may catch fire in contact with air, only need brief contact with an ignition source, have a very low flash point or evolve highly flammable gases in contact with water. |

Methane, acetone, aniline, and lithium hydride are examples of flammable materials

### Hazard symbols - Health

| Symbol  | Abbreviation | Hazard                         | Description of hazard  |
|---|--------------|--------------------------------|--|
|    | T+           | very toxic                     | Chemicals that at very low levels cause damage to health.  |
|    | T            | toxic                          | Chemicals that at low levels cause damage to health.   |
|    | Carc Cat 1   | category 1 carcinogens         | Chemicals that may cause cancer or increase its incidence.   |
|    | Carc Cat 2   | category 2 carcinogens         | Chemicals that may cause cancer or increase its incidence.   |
|    | Carc Cat 3   | category 3 carcinogens         | Chemicals that may cause cancer or increase its incidence.   |
|    | Muta Cat 1   | category 1 mutagens            | Chemicals that induce heritable genetic defects or increase their incidence.   |
|    | Muta Cat 2   | category 2 mutagens            | Chemicals that induce heritable genetic defects or increase their incidence.   |
|   | Muta Cat 3   | category 3 mutagens            | Chemicals that induce heritable genetic defects or increase their incidence.   |
|  | Repr Cat 1   | category 1 reproductive toxins | Chemicals that produce or increase the incidence of non-heritable effects in progeny and/or an impairment in reproductive functions or capacity. |
|  | Repr Cat 2   | category 2 reproductive toxins | Chemicals that produce or increase the incidence of non-heritable effects in progeny and/or an impairment in reproductive functions or capacity. |

# Chemical Hazard Symbols

|   |            |                                |  |
|---|------------|--------------------------------|--|
|  | Repr Cat 3 | category 3 reproductive toxins | Chemicals that produce or increase the incidence of non-heritable effects in progeny and/or an impairment in reproductive functions or capacity. |
|  | Xn         | harmful                        | Chemicals that may cause damage to health.   |
|  | C          | corrosive                      | Chemicals that may destroy living tissue on contact.   |
|  | Xi         | irritant                       | Chemicals that may cause inflammation to the skin or other mucous membranes.   |

# Accident Reporting

- All accidents, including minor ones, must be reported and a written record should be made. This is normally done using an accident report book.
- A report should be made as soon as possible after the accident has happened while it is still fresh in people's minds.
- It should be made by a person who has suffered the accident wherever possible or the eyewitnesses if the casualty is not in a position to report it.

# Accident Reporting

## Purpose of Accident Reports

Accident reports are used to:

1. Meet the requirements of government regulations.
2. Meet the requirements of the health and safety policy of the organization you are working for.
3. Help to make necessary improvements to reduce the risk of such accidents and injuries in the future.
4. Provide evidence for any enquiry of compensation claim.

## Essential Information

Once the First Aid person or ambulance arrives, it is important that you are able to provide essential information on:

- What has happened?
- What have you done so far?

# Accident Reporting

This is important because they will need to take over now. You will be doing this while they are working on the injured person.

## **They will want to know the following information:**

- What happened?
- At what time did it happen?
- What is your name and address ?
- What have you done so far?
- Has the injured person said anything?
- In your opinion what is the extent of the injuries?
- Who are the witnesses?

# Accident Reporting

Accident reporting should also include data about the accident such as:

1. Type of injury
2. Seriousness of injury
3. Causes of injury
4. Location of injury
5. Injury conditions
6. First aids provided for casualty
7. Relationship between work and injury

At this stage, you will be pushed away but it is vitally important that you stay around until you are told by the emergency service to go. Until they do so, you could become involved in keeping people at bay, directing traffic or carrying out requests made by emergency services.