

Emission Hazard

Emission: The production and mixture of unwanted chemical substances and by products that alter the natural composition of air in the environment

Hazards: Serious impacts on the dependents of the environment

Emission Hazards : The hazards resulted from the emission of toxic gases & unwanted chemical substances from different sources like automobiles, industries, chimneys, etc. resulting in the adverse effect in the human health and environment.

Sources of Emission

- Vehicular Emission
- Industrial Emission
- Household Emission

Vehicular Emission

The emission of harmful toxic gases like Carbon monoxide, Carbon dioxide, Nitrogenoxides, Sulphur dioxides, Lead and various other Volatile Organic Compounds(VOCs) from automobiles especially vehicles that are old and unmaintained.

Causes of vehicular emissions

Incomplete Combustion of fuels

Complete combustion of fuel

Fuel (HC) + Air (oxygen + nitrogen) => Carbon dioxide + water + unaffected nitrogen

Incomplete combustion of fuel

Fuel + Air => Unburned HC + NO_x + CO + CO₂ + SO_x +

Old and unmaintained vehicles have engines that cause incomplete combustions releasing smoke and toxic gases.

Industrial Emission:

Emission of harmful toxic gases like Carbon monoxide, Carbon dioxide, Nitrogen oxides, Sulphur dioxides, etc. as a by product of the manufacturing processes in large industries and factories especially the ones that are near residential areas and do not have proper disposal.

Household Emission:

Release of smoke from various day-to-day activities at home:

- Use of firewoods and stoves
- Smoke from chimneys
- Burning of fuels like kerosene, biomass, coal

Emission Hazards : The Adverse Effects

Environmental Hazards

Local:

- Direct exposure to evaporated fuel and tailpipe pollution

- Effects due to toxic gases like CO, NO₂, O₃, Benzene, Toulene directly mixing into air

Regional:

- Increase in number of vehicles and their emissions build up the level of pollution altering atmospheric formation like Smog, Haze, Ozone, Nitric Acid

Global:

- Concerned with global warming and ozone layer depletion, result of various CFC gases.

Health Hazards :

Evidences of emission hazards and health

Strong evidence

- ARIs (acute respiratory infections)
- Chronic obstructive pulmonary disease
- Lung cancer

Moderate evidence

- Cataract
- TB (tuberculosis)

Limited evidence

- Asthma

Insufficient evidence

- Low birth weight and perinatal deaths
- Heart disease

Mitigating Measures

Reduction in vehicular emission:

- **Clean Vehicles:**

- Well tuned and maintained – inflated tires, checked engines
- Avoidance of idling-idling exhausts to running exhausts
- Purchase of Low Emission Vehicles (LEV)
- Use of Qualitative fuels
- Use of alternative transportation fuels like bio-diesel or natural gas

- **Transportation Management:**

- Public mass transport before private transport
- Quick road construction and maintenance
- Coordination among agencies

- **Electric and hybrid vehicles:**

- **Housing Design:**

- Improved Ventilation
- Kitchen design

- **Behavioural Changes:**

- Education and awareness!!!
- Reducing exposure of children to smoke
- Reducing emission from stoves
- Modified cooking practices

Battery Hazards

The increasing global demand for batteries is largely due to the rapid increase in portable power-consuming products such as cellular phones and video cameras, toys and laptop computers. Each year consumers dispose of billions of batteries, all containing toxic or corrosive materials. Some batteries contain toxic metals such as **cadmium and mercury, lead and lithium**, which become hazardous waste and pose threats to health and the environment if improperly disposed.

Apart from mining these resources – which has a detrimental effect on Nature – a battery contains one or more of the following metals: **cadmium, lead, zinc, manganese, nickel, silver, mercury, and lithium, as well as acids.**

Harmful Chemicals Effects To Environment

- **Air Pollution:**

- Batteries undergo a photochemical reaction as they decompose in landfills.

- This causes emissions of greenhouse gases.
- The greenhouse effect results in global warming/climate change.
- **Water Pollution:**
 - The harmful chemicals found in batteries can also find their way into the local water supply, killing plants and animals which negatively affect the ecosystems of streams, lakes, and rivers.
 - Ultimately, the health of people who drink contaminated water is also at risk. The same can be said when it comes to eating fish found in polluted waters.
- **Soil Pollution:**

The danger lies in the fact that these batteries contain toxic chemicals that are absorbed by the soil. Once they leak into the surrounding areas, that's where the deleterious effects take place.

Harmful Chemicals Effects To Human

- **Leads:**
 - Inorganic lead dust is the most significant health hazard when it comes to batteries.
 - Lead can be absorbed into the body through inhalation and ingestion, both of which are equally dangerous.
 - Children and fetuses are most vulnerable since their bodies are still developing.
 - High levels of lead exposure can affect a child's growth, cause brain damage, impair hearing, harm kidneys, and

induce behavioural problems.

- Adults are also affected negatively by lead. Exposure can cause memory loss and decrease the ability to concentrate; it can even harm the reproductive system.

- **Sulfuric acid:**

Found in lead-acid batteries (commonly used in cars), sulfuric acid is highly corrosive.

- It can cause permanent blindness if it comes into contact with your eyes.
 - Ingestion of this acid can fatally damage internal organs.
- The good news is that the presence of sulfuric acid in the environment doesn't always lead to exposure. Direct contact with it is what you should avoid.

- **Cadmium:**

This is used in nickel-cadmium batteries and is considered to be even more harmful than lead when ingested.

- The International Agency for Research on Cancer (IARC) has classified cadmium as a carcinogen to humans.
- It can be absorbed through the skin by touching a battery that has split open and leaked.
- When these batteries end up in landfills, they can contaminate the soil and the surrounding areas. Eating crops that were grown from cadmium-contaminated soil can damage or destroy the kidneys.

Reducing Impacts:

Here are a few suggestions of how to reduce battery usage :

- Use mains electricity as a power source if possible, especially if it's generated by renewable energy.
- Opt for renewable energy sources like a wind-up radio or torch, dynamo bicycle lights, or a solar-powered calculator.
- Consider non-battery alternatives. For example, when buying toys for children, choose non-battery playthings.

It is going to be hard for sure considering the kind of society we now live in. We just have to accept the fact that we need batteries in our everyday lives. There's no getting away from them for the time being.

Other than that, there are two things more that you can do to reduce your environmental footprint when it comes to batteries.

1. Use Rechargeables :

The truth is, even rechargeable batteries emit harmful chemicals when disposed of, just like their disposable counterparts.

- However, most of them can be charged up to 1000 times when appropriately used. That means that you won't be throwing as many of them away compared to using single-use ones.
- Rechargeable batteries can be used over and over again, so by using them you directly help the conservation of resources (fewer batteries need to be manufactured and transported, which lessens the need to mine resources).

2. Recycling Batteries:

- People are starting recycling of lead-acid batteries nowadays.
- Reclamation companies send crushed batteries to facilities for reprocessing and manufacture into new products.
- Nonautomotive lead-based batteries, which are accepted by many automotive companies and waste agencies, are subject to the same recycling processes.
- Several reclamation companies in the U.S. now process all types of dry-cell batteries, both disposable and rechargeable, including alkaline and carbon-zinc, mercuric oxide and silver oxide, zinc-air and lithium.

Nuclear Hazards

Risk or danger to human health or the environment posed by radiation emanating from the atomic nuclei of a given substance, or the possibility of an uncontrolled explosion originating from a fusion or fission reaction of atomic nuclei.

Sources of Nuclear Hazards

Natural Sources

- Cosmic rays from outer space. The quantity depends on altitude and latitude; it is more at higher latitudes and high altitudes.
- Emission from the radioactive materials from the earth's crust.

Man-made Sources

- Nuclear power plants
- X-rays.
- Nuclear bombs, nuclear accidents.
- Mining and processing of radio active ores.
- Use of radio active materials in nuclear weapons, Missile Testing.

Effects of Nuclear Hazards

- All organisms are affected from radiation pollution, and the effects are extremely dangerous.
- The effects may be **somatic** (individual exposed is affected) or **genetic** (future generations) damage.
- The effects are cancer, shortening of life span and genetic effects or mutations. Some of the possible effects are listed as under:
 - Break DNA in cells
 - Bone marrow is affected & blood cells are reduced
 - In most of the case Man do not die, but suffer from fatigue, nausea, vomiting and loss of hair.
 - Develops different types of cancer.
 - Through foodchain also,radioactivity effects are experienced by man.

But the most significant effect of radioactivity is that it causes long range effects, affecting the future of man and hence the future of our civilizations.

Some Notable Events

Some notable events of Nuclear Hazards are

1. Three mile island - march 28, 1979:

- The Three Mile Island accident was the partial meltdown of reactor number 2 of Three Mile Island Nuclear Generating Station (TMI-2) in Dauphin County, Pennsylvania, near Harrisburg and subsequent radiation leak that occurred on March 28, 1979.
- The incident was rated a five on the seven-point International Nuclear Event Scale: Accident with wider consequences.

2. Fukushima nuclear Disaster - March 11, 2011:

Preventive Measures:

- Containment of the waste in radiation-shielded containers usually buried under ground.
- Isolation of radiation waste in remote locations such as remote caves or abandoned mines - which may also involve the use of some kind of barriers (shields).
- When the first two alternatives are not possible, the waste may be diluted till background values are achieved.