Environmental pollution

Dr. Vijay K. Khorwal

CHE 110: Environmental Studies

Unit - 4

Environmental pollution

U4_L5_CHE110_VK

Vijaykant Khorwal
Ph.D. Chemistry
(IIT Bombay,Mumbai)

Noise Pollution

- Refers to loud sound created by humans or machines that disrupt the environment and normal living of organism in it.
- The unwanted noise dumped into the atmosphere that leads to discomfort and health hazards called *noise pollution*.

❑ Sources of Noise Pollution

- ➢ Natural phenomena such as violent volcanic eruptions, thunder, fierce storms,
- ➢ Domestic appliances such as mixers, washing machines, telephones, etc.
- ➢ Industries such mills and factories
- ➢ Automobiles –music system n constant honking by drivers.
- ➢ Noise by Trains, ships, and aircrafts
- ➢ Bursting of crackers and playing loud music
- ➢ Entertainment devices such as radio, television, etc.

Measurement of Sound

- Intensity and frequency are the two important properties of sound
- The unit of measurement of intensity is decibel (dB)
- If we consider frequency, the human ear is known to be sensitive in the frequency range of 20 Hz to 20,000 Hz.
- However, human ear is more sensitive to sounds of middle frequencies, i.e. 100 Hz.
- Breathing – 10 dB
- Library – 40 dB
- bus, truck – 80-90 dB
- Jet craft – 100- 110 dB

Continue…

- The safe limit for sound for humans is 45–75 Db.
- Any sound measuring above 75 db causes discomfort to the human ears
- Lead to hearing impairment when exposed for long duration.
- Sounds above 150 Db can cause instant deafness in humans.

Effects of Noise Pollution

- **Auditory effect**
  - Exposure to high intensity sound lead to temporary deafness.
- **Non Auditory Effects**

- Physiological disorders like
  - anxiety, insomnia, high blood pressure, fatigue, increased heart beat etc.
- Loss of working efficiency-
  - poor concentration and reduces ability to think.
- Annoyance-
  - For neurotic people, they feel annoyed in noisy surroundings.

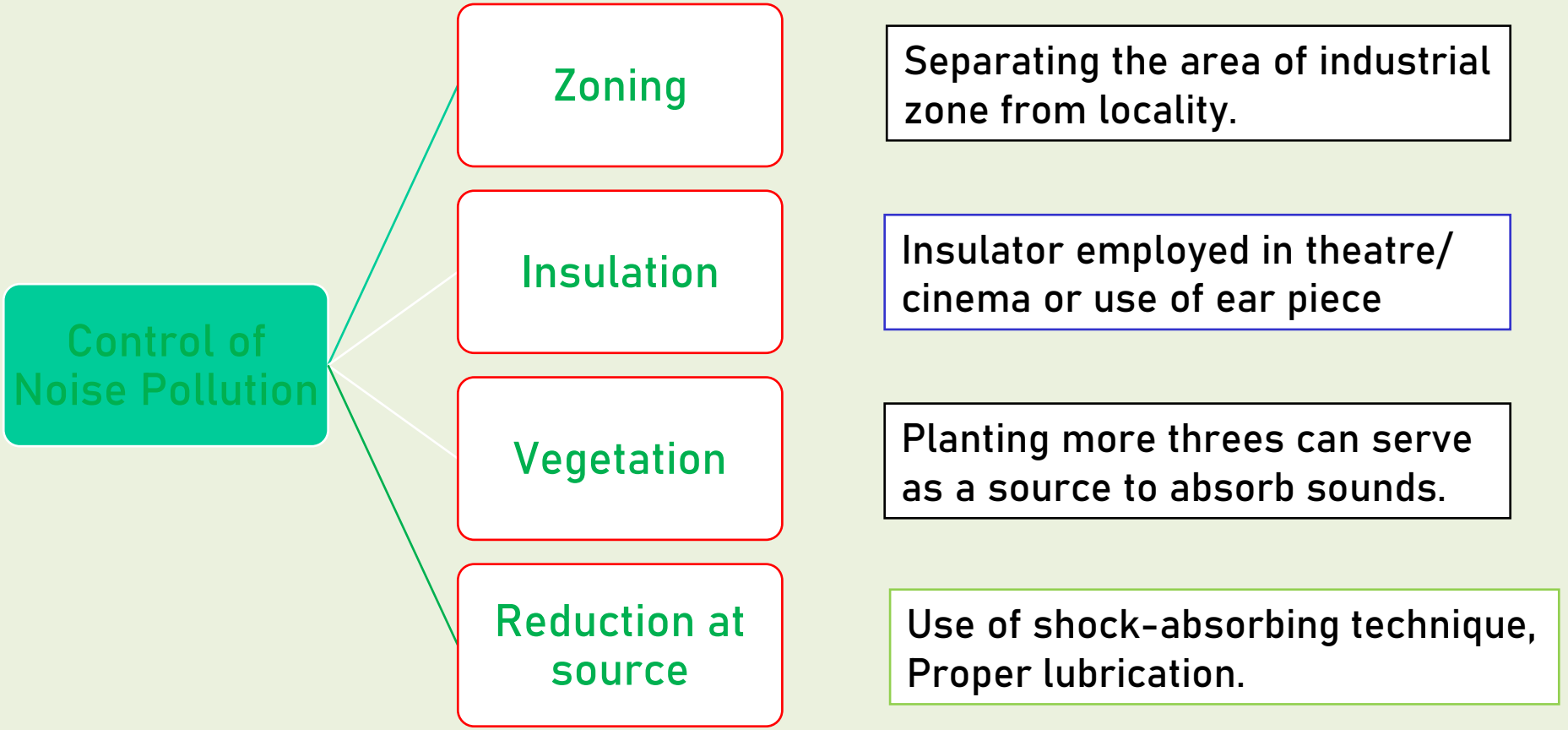
Continue…

- Decline in the number of migratory birds at noisy places.
- In alipore zoo, Kolkata , migratory birds were 15,000 in 1982, in year 2005 it become 2000
- Birds like **Saras crane** which come from far away continents **like North America and Australia** are preferring to spend winter in Howrah and east Kolkata wetlands.

Continue…

- According to Director, Alipore zoo, not only has the number of birds gone down considerably over the past two decades, the duration of their stay has also shortened.
- The reason behind is the **climate change due to global warming.**
- Managing Trustee of People for Animal (PFA), an NGO, says:
  - **Air and noise pollution**
  - **disappearance of wetlands and agricultural fields**
  - **polluted water are other factors affecting the birds' migration**
- Around 84 per cent of species of migratory birds face some form of threat from climate change.
- The water bodies in the zoo have stagnant dark water littered with garbage thrown by visitors.

Control of Noise Pollution



Control of Noise Pollution

- Workers in factories should be provided with ear plugs and ear muffs.
- Vehicular noise can be reduced by keeping the engine clean.
- Industrial noise can be reduced by keeping the machines well serviced.
- Noisy machines should be placed in special glass or wooden cabins.
- Special silencing devices should be designed for aircraft engines.
- More number of trees should be planted since they are effective sound absorbers.
- Public awareness should be created.

Radiation Pollution

❑ **Radiation pollution is the emission of any form of ionizing or non-ionizing radiation as a result of natural or human activities.**

- **Causes of Radioactive or Radiation Pollution**

❑ **Natural causes**

- Cosmic rays are high-energy protons and electrons that are released from sun.
- Environmental sources – Soil, rock, air ,etc.

❑ **Man made causes**

- Radioactive waste from nuclear power plants
- Nuclear explosions
- Medical use [X-ray]
- Radiations from luminous watches, clock dials, rays from microwave, etc. constitute the miscellaneous sources of exposure.

Effects of Radiation Pollution

❑ Somatic Effects

- ➢ Radiations can cause cataract, skin cancer, bone cancer, reduction of life span, premature ageing, cardiovascular disorders

❑ Genetic Effects- Change in DNA

- ➢ Increase in the number of abnormal children and increased infant mortality.

❑ Control of Radiation Pollution

- ✓ Dense trees should be planted around atomic power plants.
- ✓ Proper management of radioactive waste should be ensured.
- ✓ Unnecessary X-ray examination should be avoided. Lead shields should be used by workers.
- ✓ During nuclear installations, various efforts including the process of site selection, its design, construction, operation, and its short-term and long-term effects should be seriously considered to control radiation.
- ✓ Acoustic Zoning: Increased distance between the source and receiver by

Radiation pollution by cellular phones

- EMR is the radiation produced by sources such as electrical appliances, power lines, wiring in buildings, and electrical appliances
- The extensive use of cellular phones, also exposes human beings to a large dose of EMR, which poses a serious health hazard for long duration each day.
- It being a radio that sends signals on waves to a base station
- Carrier signal consists of two radiation fields: a near-field plume and a far-field plume.
- Living organism is also generated EM fields at the cellular, tissue and organ level, called biofield.
- Cellular fields are interfere with the human bio field when they are in contact.
- If bio field disturbs , causes health disorders.
- The emr from the cell and from the tower carrying signals result somewhat in brain tumours, genetic damage etc.